CONSUMERS RESEARCH

INCOMPLETE FILE

Bulletin

March 1948

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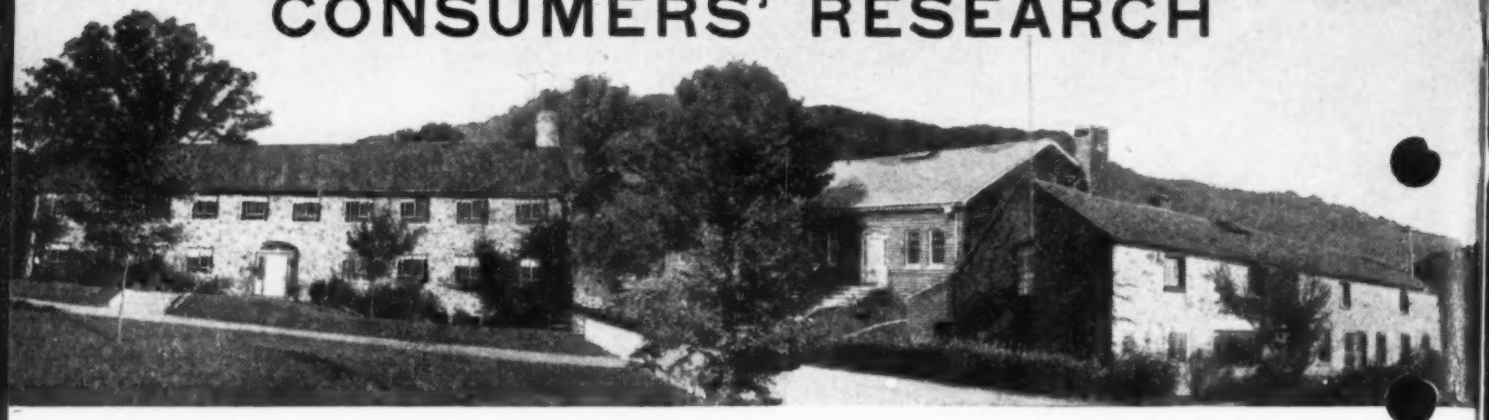
CONSUMERS' RESEARCH



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Off the Editor's Chest

SPRING is the time when thoughts of a good many people turn to building, whether it be the dream house that is ideally located in a park-like suburb, with all modern labor-saving, comfort-creating devices, a cabin in the woods, or just a garage, or a garden house for tools and the power lawn mower. One trip to the local building supply dealer for estimates and prices, however, will be so disillusioning that the prospective builder who has a place to hang his hat will undoubtedly decide to keep his future abode in the catalog-and-scrapbook stage for a while longer. The vacation shack can much more economically be a tent, and the power lawn mower can remain in the basement or garage.

It is not just material costs that are up, 100 percent over 1939, according to one estimate. Labor costs are 50 percent higher also. The cost of building may be roughly estimated as 45 percent for materials (including off-site labor), 30 percent for on-site labor, 12.5 percent for land, and 12.5 percent for contractor's profit. The enterprising home builder may undertake to be his own contractor and eliminate the contractor's profit from the bill, but unless he has engineering training or a native aptitude for such work he will probably find that his other costs will run an equal or greater amount higher because of his lack of "connections" and know-how.

According to a study in Fortune magazine last August, a "small house for moderate incomes," with eight rooms, bath, and sleeping porch cost approximately $7700 to build in 1915 and today, in good repair, *would bring twice its original cost.* One built in 1940, with six rooms, two baths, and a garage was estimated to have cost around $7200. In 1947, however, it took $7500 to buy a house (including land) which had a tiny living room, a kitchen, and two bedrooms, each just big enough for a bed. (No mention was made by Fortune of a bathroom.) It is fairly obvious that most young people just starting married life will find new homes quite beyond their means.

To some extent the higher prices for new homes are due to the present inflationary spiral which has affected all commodities and services. There are, however, a number of factors in the housing industry which represent wastes, inefficiency, monopoly practices, and what looks to the average bystander like just plain racketeering. Ever since the housing situation has been acute, various newspapers have carried items from time to time which illustrate the toll certain groups collect from prospective home owners. One of the most enlightening series in this field appeared last fall in The Wall Street Journal as the result of a 14-week survey by members of its staff.

One of their discoveries was that large builders are unable to make any savings by big volume purchases of lumber, plumbing, or electrical fixtures shipped directly to the building site from the factory. All such orders must be *cleared through local distributors, whether they make any contribution or perform any useful service connected with the order or not.* No home builder, points out the newspaper,

(Continued on page 28)

Scientific and Technical Experts and Editors: F. J. Schlink, R. Joyce, M. C. Phillips, Helen P. Alleman, A. R. Greenleaf, Charles L. Bernier, and Dwight C. Aten. Editorial Assistants: Mary F. Roberts and B. Beam.

Symbols used to indicate sources of data and bases of ratings: A—recommended on basis of quality; AA—regarded as worthy of highest recommendation; B—intermediate with respect to quality; C—not recommended on basis of quality; cr—information from Consumers' Research's own tests or investigations; **1, 2, 3**—relative prices, **1** being low, **3** high. Note that price and quality are completely differentiated in CR's listings; **a quality judgment is independent of price**; 47, 48—year in which test was made or information obtained or organized by the staff of Consumers' Research.

It will be advantageous if you will, whenever possible, send prompt notice of change of address at least 5 weeks before it is to take effect, accompanying your notice with statement of your old address with name in full. At least a month's notice must be given in any case. This rule, however, regarding long advance notice does not apply to military personnel.

¶*CR will, of course, gladly change addresses for men and women in the services as often as required by changes in station and other circumstances.*

★★★For a brief cumulative index of 1948 BULLETINS preceding this issue, see page 32.

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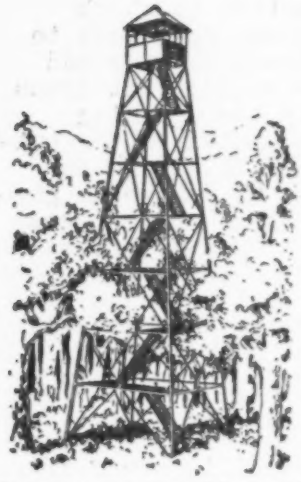


The Consumers' Observation Post

GIANT BULBS at "bargain prices" sometimes turn out to be only "bulblets," and no bargain at all, warns the St. Louis Better Business Bureau. It appears that bulbs, particularly tulip bulbs, must be grown for several years. During the second, third, and fourth years small bulblets develop which are removed each time the bulb is replanted. These bulblets must be replanted in turn for several years before they can be expected to produce plants that will bloom. Reputable growers, advises the Better Business Bureau, normally sell tulip bulbs that are at least four years old, and have a circumference of 3-1/2 inches or more. Checking on the offerings of three companies, the St. Louis bureau found that advertisements of the Smith Bulb Co., Barrington, Mich.; Michigan Bulb Co., Grand Rapids, Mich.; and Hartford Farms, Hartford, Mich., were misleading and that the bulbs offered were not likely to bloom the next year.

* * *

PRICES OF RAYON FABRICS ARE HIGH and going higher. Spring dresses will cost more, according to The Wall Street Journal, which estimates a rise of 10 to 20 percent. Dresses which were $18 in the fall will sell for $22 this spring. There is also a reported shortage of dresses retailing under $10 and $15 because low-cost rayon fabrics are so difficult to obtain. The thrifty woman will need to make one dress do where she bought two before, or perhaps she can join one of the many classes in home dressmaking that are becoming popular.

* * *

IN THE FACE OF DIRE PROPHECIES of coming meat controls and threats of rationing, cattlemen and hog raisers are reported to be rushing meat animals to the market. The shortage of grain due to heavy shipments to Europe and the talk of government controls are two factors that will effect a sharp reduction in the number of cattle that will be fattened in the feed lots during the coming year. Thus if there were no scarcity to be expected, government policies and actions are definitely on the way to creation of one. An enlightening picture of the effect of price controls and rationing on the market was recently given in a monthly economic newsletter which cited figures based on New York Sun surveys and N.Y.C. Department of Markets' data as follows:

		UNDER OPA		AFTER OPA
		OPA Ceiling	N. Y. Black Market Prices	N. Y. Prices Nov. 26, 1947
Butter.....	Pound	$.67	$.95	$.85-.97
Sirloin steak.....	"	.40-.46	.95-1.25	.69-1.00
Pork chops.....	"	.31-.40	.85-.90	.63-.79
Sliced bacon.....	"	.42-.43	.75-1.00	.82-1.00
Amer. cheddar cheese	"	.43-.48	.60-.65	.49-.69

The newsletter also pointed out what some who are in favor of a return to rationing and/or price control may have forgotten, that the majority of people who did not "buy in the black market" did not get much meat. Even when the consumer was fortunate enough to obtain meat at the OPA ceiling price, he paid, in taxes, for a subsidy of 5 cents a pound, and meat sold him cost an additional 15 to 30 percent above ceiling due to misrepresentation of quality, and refusal of butchers to trim off excess fat.

* * *

FEW THINGS ARE SO ANNOYING to a woman as having a good dress come back from the cleaner's with an important button missing. Why it is seldom possible

for the cleaner to find the wanted button afterward is a question to which there seems to be no satisfactory answer. As a rule, it becomes necessary to purchase a complete new set of buttons, since matching is time-consuming and often impossible. In self-defense, dry cleaners are wont to allege that dress manufacturers frequently use plastic buttons that dissolve in the cleaning fluid, or that in making cloth-covered buttons, the cloth is pasted to the button with a dark glue which dissolves in the solvent and stains the dress fabric. Women who have unhappy experiences with loss of buttons or damage to garments from cleaning had better start to get the situation cleared up by registering complaints with the National Institute of Cleaning and Dyeing, Silver Springs, Md., and where damage is due to unsuitable material in the buttons, to the store from which she purchased the garment originally. In these days of high prices, no woman can afford to retire from service a dress that has been made unwearable by one trip to the cleaner, either because of poor cleaning practices or because the department store or dress shop took no interest in seeing that buttons on the garment were of the proper type.

* * *

TOP-QUALITY BEETS FOR CANNING of Fancy or U. S. Grade A quality are small. (U. S. Agricultural Marketing Service Standards for U. S. Grade A Whole Beets specify a diameter of not more than 2 inches.) Now comes an announcement of a machine, called Globule Beet Machine, to make little beets out of big ones. The machine is described in The Glass Packer as taking beets 3 inches in diameter and turning them out as small spheres. As the magazine phrased it, the device makes "fancy small beets out of inexpensive large ones." Illustrating the article was a photograph of a jar of "G.L.F. Glo-Beets." No notice was visible on the label that the beets had been cut down from their original size, but if beets are packed without such notice on the label, it is surely a misrepresentation that food and drug control officials will need to go to work on.

* * *

THE GLASS BOTTLE OR GRENADE TYPE of carbon tetrachloride fire extinguisher should be discarded by occupants of house trailers, in the opinion of Dr. Edward A. Piszczek, Cook County, Illinois, health director. Tests have shown that tetrachloride fire extinguishers release the deadly poisonous phosgene gas, in the presence of heat. The deaths of 3 persons were attributed to this cause, and when firemen made tests, they discovered that phosgene gas was present in the very large amount of 83 parts per million. Dr. Piszczek pointed out that one part per million is enough to be toxic.

* * *

EGGS packed with the large end up will usually stay fresh longer, according to advice from the California State Department of Agriculture. It seems that the air cell through which the egg "breathes" is almost always at the large end. When the egg is packed large end down, the weight of the egg content "smothers" the egg so that it loses quality two or three times as fast as when packed with the small end down.

* * *

THE PRESSURE SAUCEPAN is a convenience and a timesaver in preparing a meal, but it is not suitable for cooking all types of food. Some foods that do have a better flavor when cooked in a pressure saucepan are green lima beans, green peas, and string beans, reports Merna M. Monroe in The Maine Agricultural Experiment Station Bulletin 455. Meat that is normally cooked in the oven, such as roast pork, will not have the proper flavor when pressure-cooked. On the other hand, Swiss steak and pot roast can be prepared very satisfactorily in a pressure saucepan.

* * *

SELF-SERVICE GAS STATIONS have made their appearance on the outskirts of Los Angeles. Prices on gasoline were 5 cents to a fraction of a cent less per gallon of gasoline, 5 cents a quart less for oil, than other filling stations. Banned from city limits because of a fire department regulation, the new stations have proved to be so successful that one owner began to receive threatening letters, and some of his staff were beaten up by thugs. Competition is apparently pretty rugged in California.

(The continuation of this section is on page 37)

Gas Ranges

OBTAINING eight new model gas stoves for CR's test proved to be a long-drawn-out procedure. The work was started in early May 1947 when requests for literature went out to various manufacturers, and ended in October when the last of the eight stoves finally came. Even then one brand desired (the Montgomery Ward) was not available, and a substitution had to be made. Tests were carried on and completed as rapidly as possible and final results were tabulated some time late in December; thus a total of seven months was unavoidably required for the completion of the project. (Consumers who have not tried to buy major appliances lately might think this an unduly long time; yet it was the best that *could* be done in today's market.)

Standards of Construction and Performance

All of the stoves tested were approved by the American Gas Association appliance-testing laboratory at Cleveland, Ohio; that approval assures the purchaser that the range to which it applies has met certain *basic requirements for safety of design and minimum standards of performance.* The *Universal-Eton* and *Tappan* stoves also carried the CP (Certified Performance) label, indicating that, in addition to meeting the A.G.A. specifications, these stoves conformed to additional requirements involving automatic oven lighting, better-than-usual insulation, relatively fast heating ovens, ball-bearing slides on drawers, higher than the minimum required burner efficiency, etc. Test results show, however, that several of the regular A.G.A.-approved stoves had just as great or greater burner efficiency than the CP stoves, though of course the regular stoves did lack some of the convenience features offered in the Certified Performance gas stoves.

***Universal-Eton*, Model CB 4572-2MY**

Tappan, Model V-665-3

Caloric, Model 5428

Estate Heatrola, Model JG 1704

Burner Arrangement

Three types of top burner arrangements were found in the tested stoves; each of these has its advantages and disadvantages. The staggered arrangement found in the *Roper* allows the use of very large pots and pans but leaves little clear working space. Burners grouped on one side leave a maximum amount of usable working space available on top of the stove, but if a large kettle is placed on one or two burners, other burners are crowded. However, for the small kitchen, where working space is often at a premium, the one-side burner arrangement is probably the most advantageous. The split-top arrangement with two burners on each side of a central working space, while giving somewhat less effective working surface, allows the use of large kettles and is considered to be the arrangement that would probably be preferred by most purchasers.

Ovens and Broilers

Ovens should be at least 14 inches high, 16 inches wide, and 19 inches deep, or have equivalent volume, to permit baking several layers of a cake at the same time or to accommodate a medium-sized roasting pan. For the family in which a large amount of baking is done, one of the larger ovens would be preferable, but for the small family doing little home baking or requiring large oven space on only rare occasions, a stove with an exceptionally large oven would be an uneconomical purchase, because of the extra amount of gas needed to heat it up, and maintain it at the desired temperature, as compared with a smaller oven.

Each oven was equipped with a thermostat which, when the preset temperature was reached, cut the oven heater down to a small flame just sufficient to maintain the oven temperature. In general, the thermostats held the oven temperatures quite close to the setting during one-hour runs, but in some ovens there was a tendency to "drift" away; this fault, when present, is indicated in the listings. Thermostatic control takes much of the guesswork out of baking, but has one disadvantage in stoves having "low" broilers, that is broilers immediately below the oven and operating from the oven burner. In these stoves, when the broiler is being used, the oven heats up, and as soon as the maximum thermostat temperature is reached, the burner automatically shuts off, ending the possibility of broiling until the oven has cooled down. This condition can be relieved by opening the oven door, but that, of course, would be no solution to the problem if baking was going on in the oven.

Stoves with a "high" broiler (one which is not connected with

the oven, and which uses a separate burner) do not have any problem arising because of thermostatic cut-off of the broiling operation, and this arrangement is to be preferred on the whole, to the "low" location of the broiler. Storage space available is greatly reduced in "high broiler" stoves, however, since the space below the oven is practically useless and the broiler drawer uses much of the remaining space.

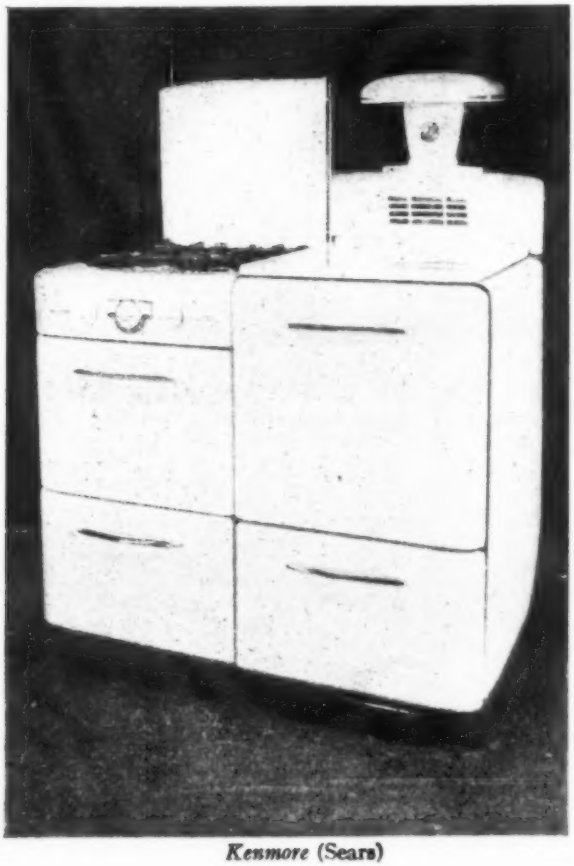
Storage Spaces

Interior arrangements of storage space should be noted by the purchaser. Shelves behind a swing-open door are preferable so far as safety of contents is concerned, as contrasted with use of drawers for storage. With shelves, stored utensils and dishes can be neatly stacked in piles which will not be toppled by joggling as necessarily occurs with the opening and closing of a drawer. Shelves, moreover, are considerably easier to clean than drawers.

Top Burners

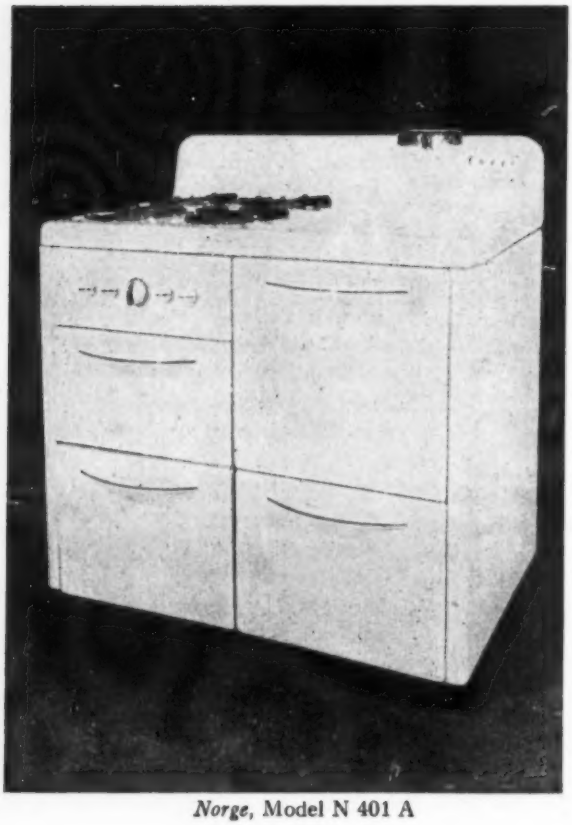
Five of the stoves were equipped with simmer burners. These are built into the regular burners, and operate from the same valves; they are intended to be put into operation as soon as the pot has been brought to a boil by the full gas flame. In order to make the most of the economy in use of gas offered by the simmer burners, the valve handle should be turned toward the off position until a click is heard, as soon as boiling starts. At this point, the outer ring of flames is usually extinguished, leaving only the inner ring of flames; this normally provides enough heat to keep the contents of the kettle simmering and not much more. While simmer burners do nothing that the housewife could not do herself if she took the trouble to reduce the flame to the right height, it is probable the simmer device will give greater fuel economy. There is also an added element of safety in stoves with simmer burners. When the housewife turns the whole gas flame low by hand, all flames are reduced in size and emerge under lower pressure, making them easily extinguished by sudden draft, whereas with the simmer burner, the flames emerge at almost full pressure and the reduction in heat is accomplished by reducing the number of flame ports in operation.

Prospective buyers should note that not all burner handles which click when turned low, control true simmer burners. All of the test stoves not equipped with simmer burners did have burners which clicked into a low-flame position when turned low. These were not true simmer burners at all, though the click may serve a useful purpose in giving a warning that the

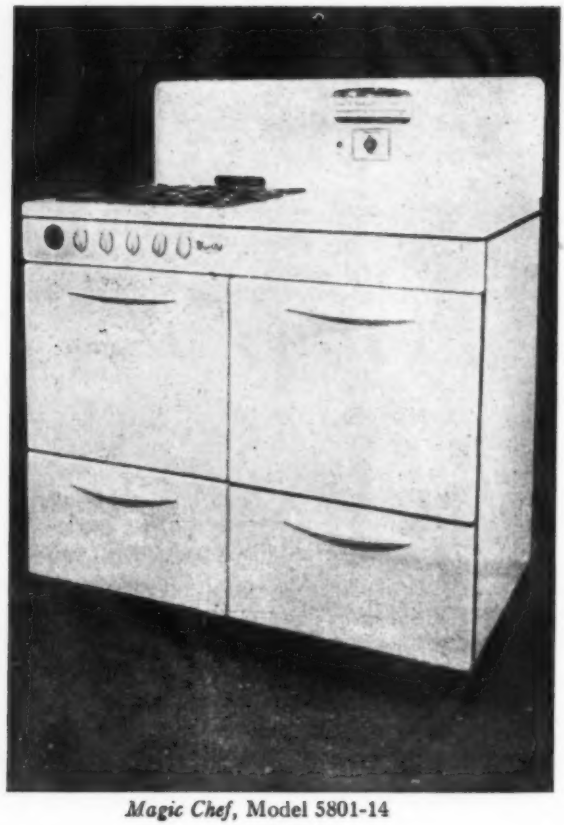


Kenmore (Sears)

Roper, Model 7-7304 S



Norge, Model N 401 A



Magic Chef, Model 5801-14

flame has been turned down to its lowest safe burning rate (assuming that the manufacturer has set the click at the proper position).

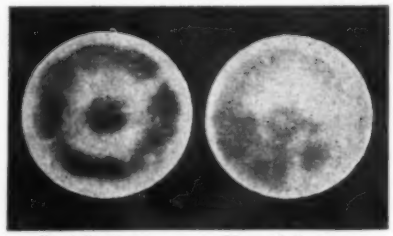
The purchaser of a new gas stove should make sure that when the serviceman comes to install it he also puts the burners into proper adjustment. Giant and regular burners should be adjusted to deliver 12,000 and 9000 Btu. per hour, respectively; air mixture, pilots, oven burner, and thermostat may also need regulating for proper flame height and safety.

Test Methods and Comments on Results

A.G.A. Laboratory methods, outlined in their Approval Requirements for Domestic Gas Ranges, were used wherever applicable, with some modifications made where it appeared that a change of procedure would give results of adequate accuracy.

Top Burners

The stoves included in the test were given a general engineering examination covering points of design, burner, oven, and storage space arrangement, and presence of special equipment. (To meet A.G.A. requirements, both giant and regular top burners must have an efficiency of 40%; a CP stove must have burners with an efficiency of 45%.) Both giant and regular burners were tested for short-time efficiency (the time necessary to bring the temperature of a standard test pan and a given quantity of water from 68°F to boiling was noted); all regular top burners were found to meet not only A.G.A. efficiency requirements but CP requirements as well; comments on the efficiencies of these burners are not given in the listings unless their performance was considered exceptional. The giant burners also all met A.G.A. requirements but only three met CP requirements; actual efficiencies of these burners are noted in the listings. "Maintenance of boiling" efficiency was checked with the flame low enough to keep the water gently boiling for 30 minutes, the simmer burner being used if possible; heat distribution from the burners was



Satisfactory scorch pattern *Unsatisfactory scorch pattern*

tested by making scorch patterns on blotting paper; and burners were given a boil-over safety test in which a covered saucepan of soap solution was allowed to boil over until either the flame went out or it appeared that the flame

could not be extinguished in that manner. Results of boil-over tests on all stoves were satisfactory.

Ovens

Ovens were checked for: (a) rate of heating (time and energy necessary to preheat to a desired temperature) at 250°F, 400°F, and 500°F; (b) heating capacity (time required to raise the oven temperature from room temperature to 400°F); (c) accuracy of thermostatic control; (d) heat supply required in Btu. per hour per cu. ft. necessary to maintain temperatures of 250°F, 400°F, and 500°F; (e) evenness of temperature distribution; and (f) effectiveness of insulation in keeping outside porcelain-enamel surfaces of the oven chamber cool as indicated by relative lowness of temperatures of outer surfaces of the door and sides of the oven (top in some cases) during operation at 500°F for 1 hour. Ovens of all the stoves tested were found to be of adequate size.

Broilers

Broilers were given heat distribution tests by making toast and observing the browning pattern, and their gas consumption was measured.

Products of Combustion

With the high-specific-gravity gas used for these tests, the amounts of carbon monoxide produced were too small for detection, even by highly sensitive apparatus. Further attempts to measure the CO content of the waste products were considered unnecessary, since satisfactory performance in this respect is a major requirement that must be met by the manufacturer in order to obtain approval by the A.G.A. Laboratory.

Carbon dioxide analyses of the waste gases were made and were given consideration in the ratings, as higher percentages of CO_2 in the waste gases indicate more efficient burners. Note is made in the listings of low percentages of CO_2, which indicate poorer efficiency in combustion of the gas.

Methods of Rating

Efficiency of burners (top, oven, and broiler) was given most weight in the ratings because high burner efficiency is one mark of high quality and skillful engineering in the design of a stove. It should be emphasized, however, that carelessness on the part of the user can nullify any possibility of fuel savings, so that high efficiency in a stove does not suffice in itself to guarantee economical use of gas.

Ratings are cr48.

A. Recommended

Caloric, Model 5428 (Caloric Stove Co., Philadelphia) $147.75 Has the split top burner arrangement; 2 "giant" burners, 2 "regular"; all equipped with simmer burners; low broiler; 1 storage drawer and 1 drop door cabinet. *Burners:* Efficiency of giant burners, 41.9%. Effectiveness of giant and regular burners as measured by time to boil, good. Maintenance of boiling efficiency, very good; distribution of heat (scorch patterns), fair. *Broiler:* Heat distribution, fair; gas consumption, less than average. *Oven:* Size, 16 x 14½ x 19. Fairly fast heating and required the lowest Btu. per hour per cu. ft. (hereafter called "gas consumption to maintain") to maintain temperature. Heat distribution, good; insulation (as affecting surface temperatures of outside of oven), fair. Temperature regulation deficient in that thermostat permitted upward drift of 21°F during 1 hour at 250°F; accuracy fair at 400°F and 500°F. *Construction and design*, good. **1**

Universal-Eton, Model CB 4572-2MY (Cribben & Sexton Co., 700 N. Sacramento Blvd., Chicago 12) $170.75 in Zone 1. A "Certified Performance" (CP) stove. Split top burner arrangement; 1 giant burner, 3 regular; simmer burners; low broiler; 2 storage drawers. *Burners:* Efficiency of giant burner, 42.5%, below CP requirements. Time to boil on giant and regular burners, good. Maintenance of boiling efficiency, good. Scorch patterns, fair. *Broiler:* Heat distribution, fair; gas consumption, less than average. *Oven:* Size 19 x 16 x 13¾. Rate of heating, fairly fast; gas consumption to maintain, about average. Heat distribution, excellent; thermostat fairly accurate, but somewhat low at 500°F; insulation, fair. Equipped with pilot light. *Construction and design*, good. **2**

Tappan, Model V-665-3 (Tappan Stove Co., Mansfield, Ohio) $254.75. A "CP" stove. Split top burner arrangement; 1 giant burner, 2 regular, 1 small; simmer burners; low broiler; 2 storage cabinets. *Burners:* Efficiency of giant burners, 46%; of *Mighty Mite* small burner, excellent; all met CP requirements for burner efficiency. Time to boil, good on all types of burners. Maintenance of boiling efficiency of giant and regular burners, good; of *Mighty Mite*, very good. Scorch patterns of giant and regular burners, fair; of *Mighty Mite*, good. The *Mighty Mite* burner seemed of doubtful and limited value, since nothing could be accomplished by it that could not be done with a regular burner, run with the valve about half open. *Broiler:* Heat distribution, fair; gas consumption, fairly high, somewhat above average. *Oven:* Size, 19 x 17 x 15. Rate of heating, fast; gas consumption to maintain, very good (much below average); heat distribution, fair. Thermostat setting somewhat low, and temperature tended to drift downward about 25° when oven was run for 1 hour at 400° and 500°. Insulation, fair on door; good on sides. Equipped with automatic safety type pilot light. An "oven on" indicator light operates independently of the oven valve and should flash only when flames are burning; this could be a valuable safety feature, but the one on the stove tested did not actually work. *Construction and design*, excellent. **3**

B. Intermediate

Estate Heatrola, Model JG 1704 (Division of Noma Electric Corp., Hamilton, Ohio) $174.95. Split top burner arrangement; 1 giant burner, 3 regular; simmer burners; high broiler; 1 storage drawer. *Burners:* Efficiency of giant burner, 41.5%. Time to boil, on giant burner, fairly good; on regular burners, good. Maintenance of boiling efficiency: on giant burner, very good; on regular burner, fair. Scorch patterns, good. *Broiler:* Heat distribution, excellent (best of stoves tested); gas consumption, somewhat below aver-

age. *Oven:* Size, 20 x 17 x 14. Rate of heating, fairly fast at 250° and 400°; slow at 500°; gas consumption to maintain, above average at 250°; much above average, poorest of stoves tested at 400° and 500°. Heat distribution, rather poor. Thermostat fairly accurate. Insulation, fair. CO_2 content of oven waste gases, low, indicating inefficient combustion. *Construction and design*, good. **2**

Roper, Model 7-7304 S (Geo. D. Roper Corp., Rockford, Ill.) $238.50. Staggered burner arrangement; 2 giant burners, 2 regular; simmer burners; high broiler; 1 storage drawer. *Burners:* Efficiency of giant burners, 41.2%. Time to boil on giant burners, fair; on regular burners, good. Maintenance of boiling efficiency, fair. Scorch patterns of giant burners, fair; of regular burners, good. *Broiler:* Heat distribution, fair, but not as good as it should be in a high-broiler type of range. Gas consumption, fairly high. *Oven:* Size, 20 x 16 x 16¼. Rate of heating, fairly fast; gas consumption to maintain, about average. Heat distribution, fair. Accuracy of thermostat, good. Insulation, very good. *Construction and design*, good. **3**

C. Not Recommended

Kenmore (Sears-Roebuck's retail stores No. 28330) $139.95. Burners all on left side, with cover; 2 giant burners, 1 regular; no simmer burners; low broiler; 2 storage drawers. *Burners:* Efficiency of giant burner, 46.2%; of regular burner, 50.4%; both somewhat better than the *A*-rated *Tappan* CP range. Time to boil: on giant burner, good; on regular burner, very good. Maintenance of boiling efficiency: on giant burner, very good; on regular burner, good. Scorch patterns, good. *Broiler:* Heat distribution, fair; gas consumption, somewhat below average. *Oven:* Size, 20 x 18 x 17, largest of stoves tested. Rate of heating, slow, partly due to large size. Gas consumption to maintain, highest of stoves tested at 250°; considerably above average at 400° and 500°. Heat distribution, least uniform of ovens tested (variation of 27° between hottest and coolest points, at 400°). Insulation of door, good; of sides, fair. *Surface burners* were slightly below the level of adjoining porcelain range top and hot gases escaping from under kettles on right-hand burners overheated the porcelain top, causing strain that led to cracking (poor design). **1**

Magic Chef, Model 5801-14 (American Stove Co., Long Island City, N.Y.) $127.25. Burners all on left side; 1 giant burner, 3 regular; no simmer burners; low broiler cabinet storage space with 3 shelves. *Burners:* Efficiency of giant burner, 44.2%. Time to boil on giant and regular burners, good. Maintenance of boiling efficiency, fair. Scorch patterns of giant burner, good; of regular burners, fair. *Broiler:* Heat distribution, poor; gas consumption, highest of stoves tested. *Oven:* Size, 19 x 16 x 13. Rate of heating, fastest of stoves tested. Gas consumption to maintain, above average. Thermostat high at all settings; temperature tends to overshoot setting when oven is heating up, then drops back quickly; this should not cause trouble if oven is used from a pre-heat start, as it normally would be. Heat distribution, very good. Insulation, good. CO_2 content of oven gases, lowest of all tested, indicating inefficient combustion. *Gas burner handles* were made of stamped steel, with a very poor white finish which yellowed, chipped, blistered, and peeled during the short period of the tests. Continued deterioration would seriously affect appearance of the range; otherwise would have merited a *B* rating. **1**

Norge, Model N 401 A (Norge Div., Borg-Warner Corp., Detroit) $150.45. Burners all on left side; 1 giant burner, 3 regular; has *Hi-Lo Click* simmer valves on two of the regular burners (*not* simmer burners; turning valves to "*Lo*" position merely reduces size of all the flames); low broiler; 2 storage drawers. *Burners:* Efficiency of giant burner, 48.3%, of regular burner, 51.7%; best of all stoves (including *Tappan* CP) tested. Time to boil on giant burner, poor (longest of any stove tested); on regular burners, good. (Giant burner delivered only 8200 Btu. per hour, below the A.G.A. requirement.) Burners rest insecurely on a thin piece of strap iron, which made them difficult to align and keep in proper position. Maintenance of boiling efficiencies, fair. Scorch patterns, fair. *Broiler:* Heat distribution, good; gas consumption, somewhat below average. *Oven:* Size, 20 x 16 x 14½. Rate of heating, fairly fast at 250° and 400°, rather slow at 500°. Gas consumption to maintain, less than average. Heat distribution, very good. Thermostat slightly low at all temperatures and gave poor control; oven temperature drifted badly, by 58° from 230° to 288° at 250° setting during 1 hour. Insulation, good. **1**

Availability of DAB *Automobile Paint at a Reduced Price*

THOSE subscribers who may be contemplating painting their automobiles with one of the new automobile enamels reported in CR's November 1947 BULLETIN may be interested in the offer of a subscriber (a painting and decorating contractor) to make *DAB* available from his stock of 1400 quarts at a special price of $3.55 per quart, postpaid (regular price, $5.95). The dealer's stock includes the following colors: Pico Tan, Sun Beige, Jewel Green, Brewster Green, Gunmetal Grey, Canyon Grey, Washington Blue, Monterey Blue, and Black.

Orders should be sent direct to Henry R. Hastings, 438 Clapboardtree St., Westwood, Mass., and should be accompanied by check or money order for the full amount.

Five Radio Receivers

THREE of the twelve radio receivers which were purchased for this test had to be returned to the dealer for servicing. This difficulty is illustrative of today's generally poor inspection practices in the factories, and indicates that consumers are justified in being critical of radio and related items purchased under present conditions.

The five table-model radio receivers of the above-mentioned group reported at this time used superheterodyne circuits and were designed for operation on both a-c and d-c household power lines. All had loop antennas, provision for connection of external antennas, and automatic volume control; the *Airline* was the only receiver which lacked a tuned-radio-frequency stage (which is needed). The audio frequency range referred to in the listings was actual acoustical range delivered by the loudspeaker of the receiver, as measured by use of a microphone. Leakage currents in all cases were excessive (around 3.5 ma.), and none of the receivers is considered safe for use in a kitchen or bathroom, or where it might be touched by small children, and for this type of use all would be rated *C. Not Recommended*. All bore the Underwriters' approval label.

Two sets in the group, *General Electric 220* and *RCA Victor 66X3*, afforded reception on a short-wave band, in addition to the regular broadcast band. Number of tubes given includes rectifier tube.

B. Intermediate

Bendix, Model 0636 C (Bendix Radio Div., Bendix Aviation Corp., Baltimore 4) $44.95. 6 tubes, including rectifier. Sturdy, thin maple plywood cabinet of pleasing appearance. Parts and workmanship, good; accessibility for servicing, good. Sensitivity and selectivity, good. Approximate audio-frequency range 55 to 3500 cycles (fair). Two-position tone control, which acts as bass control only. Acoustical quality on listening test judged good, with good tone balance for table model. Audio output (volume), fair. Phonograph input provided. **3**

Silvertone (Sears-Roebuck's Cat. No. 57—08052) $42.75. 6 tubes, including rectifier. Wooden cabinet with walnut finish. Parts and workmanship, good; accessibility for servicing, good. Selectivity, fair; sensitivity, good. Least susceptible to man-made interference of the sets tested. Either manual or push-button tuning. Approximate audio-frequency range 130 to 4000 cycles (fair). Continuously variable tone control. Acoustical quality in listening test judged good for a table model — about equivalent to *Bendix 0636 C*. Audio output, fair. **3**

* * *

The following two receivers, while rated *B. Intermediate*, were not considered equal in quality to the two receivers previously listed.

General Electric, Model 220 (General Electric Co., Bridgeport, Conn.) $49.95. 6 tubes. Imitation walnut cabinet of a plastic material. Parts and workmanship, good; accessibility for servicing, fair, with some crowding of parts. Dial calibration found somewhat inaccurate. Sensitivity and selectivity, good. Approximate audio-frequency range 130 to 3200 cycles (not good). Two-position tone control. In listening test, tone sounded hollow and somewhat restricted. Audio output, good for table model. Performance poor on short-wave band. A mica capacitor became short-circuited during the test, necessitating replacement. **3**

RCA Victor, Model 66X3 (RCA Manufacturing Co., Inc., Camden, N.J.) $49.95. 6 tubes. Walnut and mahogany cabinet. Parts and workmanship, good; accessibility for servicing, good. Sensitivity, good; selectivity, fairly good. Strong spurious response at 550 kc. Approximate audio-frequency range 160 to 3800 cycles (fair). Two-position tone control. Acoustical quality on listening test judged only fair—lacked bass. Audio output, fair. Short-wave performance only fair. Phonograph input provided. **3**

C. Not Recommended

Airline (Montgomery Ward's Cat. No. 62—1503M) $21.95, plus postage, by mail order; $23.95 at retail store. 5 tubes, including rectifier. Imitation walnut cabinet of a plastic material. Parts, good; workmanship, average; accessibility for servicing, good. Sensitivity, fair, but varied; tracking, poor. Selectivity, fair. Many spurious responses, and very bad image response at 1000 kc. Approximate audio-frequency range 140 to 3800 cycles (fair). Acoustical quality in listening test judged fair. Audio output, fair. This receiver was returned to the retail store because of the very bad image response and poor tracking. A new test will be made of the replacement sample; present rating, therefore, is to be considered tentative. **2**

Front — *Silvertone, RCA Victor, Bendix.* **Rear** — *General Electric, Airline.*

Pipings from a Pied Piper

IF you put salt on a bird's tail, you can catch him. If you pick a guinea pig up by his tail, his eyes will fall out. If you use ANTU or 1080, you will kill all the rats infesting your premises. Simple, isn't it?

Courtesy Fish & Wildlife Service

Some careful researchers, whose findings have little sales or advertising value, point to the existence of four species of rodents normally infesting buildings and causing a high percentage of the reputed rodent damage. These are: (1) the Norway rat (*Rattus norvegicus*), sometimes called brown rat, barn rat, wharf rat, sewer rat, water rat, and gray rat; (2) the black rat (*Rattus rattus rattus*); (3) the roof rat (*Rattus rattus alexandrinus*), sometimes called the Alexandrine rat and gray-bellied rat; and (4) the house mouse (*Mus musculus*).

Rats live from three to five years. Sexual maturity comes in two to four months, although growth continues for 18 months. Breeding can take place every month in the year; the average number of litters in a year varies from three to six, with eight or nine young in each litter for the Norway rat and an average of over six for the *Rattus rattus* subspecies. Gestation covers from 21 to 25 days. There is a record of 1500 young produced from a single pair of captive Norway rats in one year. House mice average five or more young per litter. The young are weaned in three weeks, become sexually mature in 42 days.

Reproductiveness in rats and mice is dependent on such factors as climate, health, and food supply. With abundant nutritious food, production of litters is more frequent, and there is a decrease in the mortality rate of the young.

There have been large figures set forth showing estimated rat and mouse damage to property annually. Rats will gnaw to obtain food, to gain access to buildings, and to keep their ever-growing incisors at proper eating and fighting length. There are records of rats and mice that have chewed matches and the insulation of electric wires, thereby causing fires. Rats and mice, through the fleas, lice, and mites which infest their bodies, are the known carriers of diseases, the number of which gives evidence of increasing. The cost of ridding one's premises of rats and mice must be considered as in the nature of insurance. This cost is not always just an out-of-pocket expenditure; it also requires effort, a spot of ingenuity now and then, and some "know how," if expenditures are to be economically applied.

It is a fallacy to assume that the absence of known food in any given area precludes the presence of rats. Rats are capable of traveling long distances and have been known to establish temporary refuges along their routes from nest to food, and return. They can be commuters, too.

Control Methods

Many methods for control have been developed, but none, of course, is perfect. The ones most likely to succeed are exclusion, fumigation, trapping, and poisoning.

Exclusion, or rat-proofing, at the time a building is being erected does not increase total cost materially. Rat-proofing existing

buildings may entail a considerable outlay of money. If the reader wishes further information on this subject, it is available in Dr. Tracy I. Storer's "Control of Injurious Rodents in California," California Agricultural Extension Service Circular 79, or in U.S.D.A. Farmers' Bulletin 1638 (5 cents, from Superintendent of Documents, Washington, D.C.). These will give a good indication of what should be done and what good-housekeeping and work procedures are necessary for success.

Fumigations require special knowledge and skill. They are as a rule costly and require vacating the premises for a minimum of 24 hours. A large number of municipalities require that fumigation contractors meet certain requirements and conduct their operations in accordance with certain specifications, aimed to protect the safety of users of their services, their employees, and the community. It should be noted that some communities will have regulations for the use of hydrocyanic acid gas only. Methyl bromide, chloropicrin, and carbon disulphide are often used by pest control operators. *These gases (which should be used by experts, not inexperienced or untrained persons) present the hazard of poisoning also; and we believe that the same precautions are necessary if your and the public's safety are to be protected.*

Trapping will more than likely prove satisfactory for mice, if one lays out enough traps, equipped with suitably attractive baits. Rats, on the other hand, soon become trap-wise and unless the trapper is especially skillful and ingenious, this method frequently gives disappointing results.

Poisoning the Preferred Method

For the householder, poisoning is the method most likely to produce results with rats. Here, too, certain procedures are necessary. The writer believes that the success of any poisoning program depends primarily on the skill of the poisoner rather than on the poison used. There is a long list of chemicals toxic to rats, but because rats are warm-blooded animals, anything which will kill them is likely to kill man and other animals also, with the possible exception of Red Squill, which has inherent emetic properties. Lethal dosages usually bear a relationship to body weights. The selection of the poison and its method of application should be determined from a toxicological point of view. The great toxicity to man and domestic animals of such poisons as arsenic, barium carbonate, phosphorus, zinc phosphide, strychnine, and thallium sulphate are generally known. Some, but not all, states have passed legislation regulating the sale of certain specific poisons, and a Federal law now regulates labeling on new consumer packages.

Editor's Note: This article is condensed from a study on rat control, which may be issued later, by Consumers' Research, as a special bulletin at 25 cents per copy, if there is sufficient demand from subscribers for the material. The complete article includes information about signs of rodent infestations, identifications of species, procedures to be used in pre-baiting foods to be used in baiting, use of tracking poisons, and other valuable data.

Sodium fluoroacetate, *1080*, is a new and much publicized rat poison, a war baby, born, we are told, as a result of government and industry research effort. It is highly toxic to man and other warm-blooded animals, and there already are some reports of fatal poisonings even among presumably skilled rodent control specialists. *There is no known antidote.* It is sold only to experienced pest control operators. In practice, the poison is placed out in shallow drinking cups at floor levels. If you observe these containers, *do not touch them*, whether they are full or empty. Lethal dosages to you can be easily transferred from cup to hands to mouth. Dogs and cats have been known to die from eating or mouthing carcasses poisoned with *1080*.

Alphanaphthylthiourea (*ANTU*) is considerably less toxic to man than any of the group thus far mentioned, although much work on the toxicology of this material remains to be done. Dr. James C. Munch, addressing a meeting of the National Association of Insecticide and Disinfectant Manufacturers in New York, December 1946, stated that work done on monkeys indicated that the lethal dosage for humans would be 4000 to 5000 milligrams per kilogram of body weight, or approximately ½ pound of ANTU for a 150-pound man. Other preliminary data on lethal doses for other animals supplied by Dr. Munch include:

Animal	Lethal Dosage Milligrams of ANTU per kilogram of body weight
Cats	100-500
Dogs (adults)	25-35
Dogs (puppies)	75
Chickens (adult)	2500-5000
Baby chicks	Very susceptible
Pigs	37.5
Squirrels	200-300
Black rat	250
Norway rat (adult)	6-7
Norway rat (immature)	60
Mice	60-80

A dosage of ANTU which fails to kill a rat creates a resistance to further poisoning which is set up within three hours, and persists for 30 days. During this time, rats can survive five to twenty times the average lethal dosage. It takes three times as much ANTU to kill a male rat as a female; in mice this is reversed. Recently it has been found in laboratory tests that rats build up a resistance to ANTU in the months of December through February. During this time, dosages required

Courtesy Fish & Wildlife Service

Norway Rat

to kill increase from 6 mg. per kg. of body weight to 260 mg. As far as is known, tolerances are typical only of rats. For monkeys, lethal dosages are 175 to 200 milligrams per kilogram of body weight if the chemical is injected into the blood stream; administered orally, the lethal dosage is 4000 to 5000 milligrams per kilogram of body weight.

To help overcome the toxicity of this chemical to dogs and cats particularly, many of the ANTU formulations now on the market contain tartar emetic. Unfortunately the inclusion of tartar emetic reduces the acceptability of baits by rats by as much as 50% in some tests.

From the above, it can be seen that ANTU produces some seemingly illogical results. It is effective against the adult Norway rat, and *that is all that the primary manufacturer claims for it.* Implications that infestations are composed solely of this breed are not justified. Based on the life history of rats of this species, complete riddance of Norway rats using ANTU in baits appears to require three applications spaced at least 30 days apart, and it seems doubtful it will work successfully during the months mentioned.

ANTU shows promise of becoming a very useful material when applied in a proper manner and in sufficient concentrations, if its limitations are recognized and taken into account. It also lends itself to control application by the so-called tracking method (dusting where rats travel so that rodents pick up the powder on their feet and bodies).

Antidotes for ANTU are insulin, iodides, intravenous injections of dextrose and glucose, and the administration of calcium gluconate.

In handling ANTU, care should be taken *not to breathe in any of its dust.* If there are cuts or abrasions on the hands, rubber gloves should be worn, and probably one should not smoke. There is no known fire hazard; however, when smoking one continuously brings one's fingers close to the mouth, and transference of ANTU from hands to mouth in this manner is possible.

In heavy infestations, where quick clean-up is necessary, a combination of poisoning through baiting with fortified Red Squill, after dosages have been determined by prebaiting and tracking with use of a 20 to 25% ANTU content dust under proper safety precautions recommended. This has worked out successfully. While there are no definitive records on which an opinion can be based, we believe that baiting should precede tracking by at least a week, for there are indications the ANTU dust may have some repellent qualities.

One can readily imagine that research on rodent control is still going on. We are, it seems, far from a "push button" method. People who read widely will soon be hearing of two new chemicals discovered in Germany during the war, called p-Dimethylaminobenzene diazosulfonic acid, sodium salt, and 2-Chloro-4-dimethylamino-6-methylpyrimidine, the latter being called "Castrix" for short. Little is generally known concerning them as yet, and we are hesitant to make any forecast at this writing.

Insect Infestations Involved, Too

One phase of rodent control rightfully receiving increasing attention today is the control of fleas, lice, and mites infesting rodents. The way in which disease is transmitted from rats through these parasites to man and other animals is generally known. When a rat or a mouse dies, these external parasites soon seek another host. Frankly, at this writing, a method for control of the mites is an unknown; we know of only one formulation which shows any possibility as a control for these creatures on the commercial scale indicated. DDT apparently is not effective against mites. For the control of fleas and lice, 10% DDT can be incorporated into the ANTU formulation for tracking at little extra cost, and some measure of control will be obtained; however, for dusting in and around chicken houses, DDT should not be included. Fumigation automatically takes care of the fleas and lice; its effect on mites is not known.

Following trapping and poisoning with baits, there is always danger of a flea infestation. Dead rodents should be removed and burned or buried as soon as dis-

covered. *Do not pick up rodents with bare hands; use gloves or a shovel.* If you are suspicious or aware of a flea infestation, you may be sure that it is fairly well established and spread by this time. Without knowledge of the conditions prevalent in the area, one cannot safely recommend DDT for control, because of hazard in its use. A formulation known as Arfax Insect Killer, a Pyrenone base powder, is nontoxic, and small quantities of this powder applied as directed will give the results desired.

One gathers on reading the above that there is no easy or, to use a colloquialism, "two-bit" road to good rodent control, and that is a fact, but a good deal can be done with care and intelligent application of existing knowledge.

Some Useful Bulletins and Books

Decker, G. C., et al. 1941. Rat Control. Agriculture Experiment Station, Iowa State College, Bulletin P33 (new series).

Gunderson, H. A., and G. C. Decker. 1942. Rodent Pests of Iowa and their Control. Agric. Exp. Sta., Iowa State Coll., Bul. P 43 (new series).

Hodgkiss, H. E., and J. O. Pepper. 1944. Rat Control. Agric. Ext. Service, Pennsylvania State Coll., Circ. 269.

Mallis, Arnold. 1945. Handbook of Pest Control. MacNair Dorland Co., 254 W. 31 St., New York 1. $6.

Silver, James, et al. 1930. Rat Proofing Buildings and Premises. U.S.D.A. Farmers' Bulletin No. 1638. 5 cents, from Superintendent of Documents, Washington, D.C.

Storer, Tracy I. 1933 (revised 1942). Control of Injurious Rodents in California. Calif. Agric. Ext. Serv., Circ. 79.

A few manufacturers of products considered in the foregoing are:

Arfax Insect Killer: Fairfield Laboratories, Inc., 312 W. Second St., Plainfield, N. J.

Dobbins No. 133 Dusters: Dobbins Mfg. Co., Elkhart, Ind.

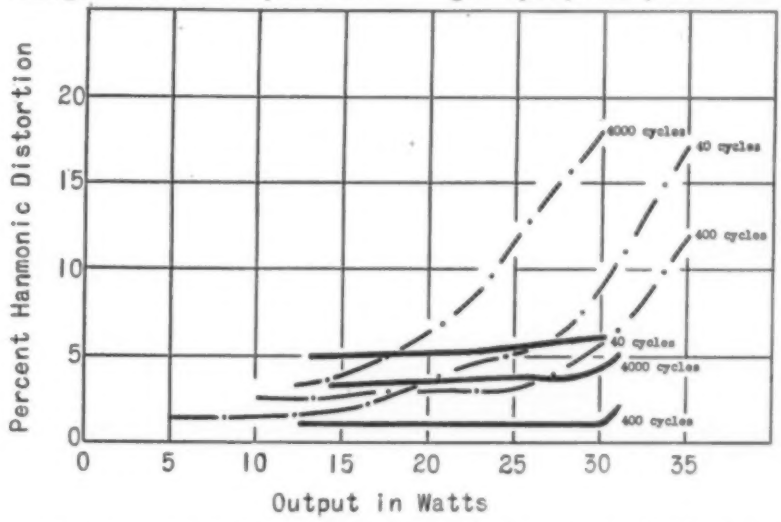
Martindale Masks: Standard Safety Equipment Co., Chicago.

Fortified Red Squill: S. B. Penick Co., 50 Church St., New York City.

★ An Audio Amplifier of High Quality ★

A. Recommended

Direct-Coupled Amplifier, Model ACA-100DC (Amplifier Corp. of America, 396 Broadway, New York 13) $187.20. Set of matched tubes $12.07 extra (13 tubes used, altogether). For operation on 105-120 volts, 50-60 cycles a.c. Rated power input, 150 watts. Ruggedly constructed, with good quality parts throughout. Had phonograph and radio input channels; input impedances, 500,000 ohms on each. Output impedances available at terminals—4, 8, 16, and 500 ohms. Among 7 controls used are radio, phonograph, high frequency, low frequency, expander-suppressor, and master gain control. The use of the volume-expansion circuit was not considered an advantage. (This feature is a "sales point" that has appealed to many consumers, but CR doubts whether it has substantial merit in consumer use, or that it will be highly regarded by those who have tried it for a time.) It is felt that the large number of controls used would make the installation of a remote control for this amplifier complicated and difficult if it were purchased for use in a "custom installation." Over-all gain, 91 db. Output at 5% distortion at 400 cycles, 29 watts (very good). Electrical fidelity measured as ±2 db., from 20 to 13,000 cycles (maker claimed upper limit of 17,000-25,000, but difference is unimportant for all practical purposes). Hum and noise level, —55 db. The bass reproduction of the *Model ACA-100DC* was considered the equal of the *Brook* when compared in listening tests, using an instantaneous switching device from one amplifier to the other, and with carefully adjusted equivalent power levels. The output of this amplifier at the higher frequencies, however, was considerably below that of the *Brook* (see Figure 1) when distortion was held at a constant low level. An important advantage of the *Brook* amplifier over the *ACA-100DC* was that it had less distortion at higher outputs, that is, above 12 to 18 watts. This difference in output distortion is quite possibly a major contributing factor to "listener fatigue," which was judged to be somewhat more noticeable when listening to the *ACA-100DC* amplifier; it is considered to be a more or less necessary characteristic of amplifiers which use "Beam Power" tubes in the output stage, when operation is at medium to high output (volume) levels. 3



Curves showing the percent harmonic distortion at various output levels for the Brook *amplifier (solid lines) and the* ACA, *Model 100DC (broken lines) at the test frequencies marked. The marked increase in distortion of the* ACA *curves at the medium and high outputs (17 watts up) should be noted. This difference would probably not be important in normal use of the amplifier at volume levels needed in the average room of a home. The* Brook Amplifier *which was used in taking the above curves was found to be somewhat below par in its low frequency performance. In preliminary measurements a replacement unit showed only 2 percent distortion at 40 cycles with 25 watts output (2.5 percent distortion at 30 watts).*

Four Electric Refrigerators

RECENTLY purchased refrigerators of brands on which numerous inquiries have been received are reported here. To save space, the test methods are not repeated. They were the same as for the refrigerators previously reported in CR's September 1947 issue.

For the reader's convenience in making comparisons, five of the refrigerators discussed in that issue and the *Hotpoint* reported in the December 1947 issue have been included in the table giving a summary of the test data.

Outer surfaces of all cabinets were finished in white lacquer and inner surfaces of food compartments in white vitreous enamel. Inner surfaces of doors were of a polished plastic material.

A. Recommended

Philco, Model A-731 (Philco Corp., Philadelphia) $254.50. Total rated capacity, 7.1 cu. ft. (actual, 7.1 cu. ft.). Rated shelf area, 14 sq. ft. (actual, 13.9 sq. ft.). Compressor, sealed type. Condenser, finned-tube type mounted diagonally at rear of machine compartment and cooled by natural circulation of air through a cardboard duct at rear of cabinet. Refrigerant, *Freon 12*, controlled by capillary tube. Freezer compartment (storage capacity, 0.52 cu. ft.), fitted with door having a large clear plastic window; refrigerated on both sides, top, bottom, and both shelves. Had 4 ice cube trays with loose-leaf guides and levers for releasing cubes. Time required to lower average temperature to a stable value (40.3°F) with control set at about mid-position and room temperature at 90°F, 8 hours (better than average). Cost of operation at 90° room temperature with an average temperature of 43° inside box, $1.03 per month (14.5 cents per cu. ft. per month), about average. This would correspond to approximately 77 cents per month with an 80° room temperature. With temperature control set at *F* (coldest position), time required to freeze ice cubes was approximately 2.75 hours (good). Motor ran continuously during freezing period. Temperature in cabinet during freezing period, maximum 48.8° and minimum 32.5° (satisfactory). **2**

B. Intermediate

Coolerator, Model DR-85 (Coolerator Co., Duluth, Minn.) $289. Total rated capacity, 8.3 cu. ft. (actual, 8.3 cu. ft.). Rated shelf area, 16.5 sq. ft. (actual, 17.5 sq. ft.). Compressor, sealed type. Condenser, finned-tube type mounted horizontally at bottom of machine compartment and cooled by natural circulation of air. Refrigerant, *Freon 12*, controlled by capillary tube. Frozen food compartment (storage capacity, 1.3 cu. ft.), equipped with drop-type door and cooled by 2 horizontal refrigerated shelves and coils in the back of the compartment. Had 5 ice cube trays to make 70 cubes (9.7 lb.) of ice, with 1 tray equipped with built-in release lever. Had bin for non-refrigerated storage. Time required to lower average temperature to a stable value (43.6°) with control set at *Normal* and room temperature at 90°, 12 hours (about average). Cost of operation at 90° room temperature with an average temperature of 43° inside box, $1.31 per month (15.8 cents per cu. ft. per month), next to highest of the 10 boxes reported. This would correspond to approximately 98 cents per month with an 80° room temperature. With temperature control set at *5c* (coldest position), time required to freeze ice cubes was approximately 3½ hours (good). Motor ran continuously during freezing period. Temperature in cabinet during the cube-freezing period, maximum 51° (somewhat high) and minimum 38.6°. **2**

Editor's Note:

Recently there have been numerous announcements of new models of electric refrigerators, which may suggest that the backlog of orders is fast being worked off and that price competition may again become a factor in this important trade. Electric refrigerators are an item of great importance to consumers, as available information indicates that electrical refrigerators constitute one-third in number, 4/10 in dollars, of the large electrical appliances sold.

General Electric has announced a two-door two-temperature 8 cu. ft. model which it is claimed occupies no more floor space than the usual 6 cu. ft. box; unfortunately the price of this new model is close to $400. Elimination of the drying out of fresh food and of the need for defrosting (except in the freezer part of the appliance) are among the claims made for the new box. Kelvinator has new models that have been redesigned with full length doors, and the entire insides of the cabinets refrigerated, including the vegetable storage bins.

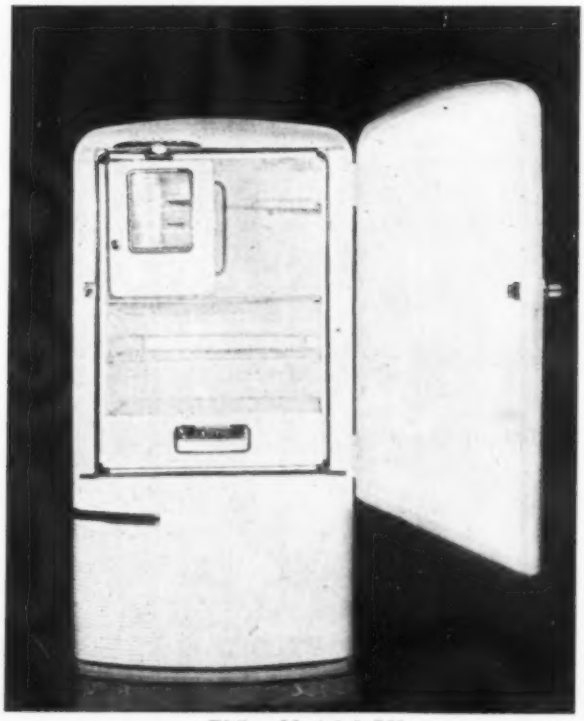
CR will test the new models as they appear on the market. This, of course, is not as satisfactory as testing all new models of a given kind of appliance at once, and it has the unfortunate result of greatly increasing the expense of the testing. (There is a disadvantage also from this from the subscribers' standpoint in that it is not so convenient when test reports on various brands of a given appliance are not all presented in a single issue, but must be spread through several issues, but that is a price that must be paid, under the present unusual conditions. The difficulty simply cannot be avoided since appliance manufacturers no longer bring out their new models at the same time.)

Crosley Shelvador, Model SE 747 (Crosley Division, Avco Mfg. Corp., Cincinnati 25) $279.95. Total rated capacity, 7.3 cu. ft. (actual, 7.1 cu. ft.). Rated shelf area, not given (actual, 13 sq. ft. including 2½ sq. ft. in door). Compressor, sealed type. Condenser, finned-tube type mounted horizontally below compressor and cooled by natural draft. Refrigerant, *Freon 12*, controlled by capillary tube. Had 5 narrow shelves of sheet aluminum attached to door liner. Freezer compartment (storage capacity, 0.6 cu. ft.) was refrigerated at the bottom, sides, and under upper shelf; a lower non-refrigerated shelf was removable. Had 4 standard-size and 1 double-width ice cube trays. Had bin for non-refrigerated storage. Time required to lower temperature to a stable value (46.5°) with control set at *5* and room temperature at 90°, 9 hours (about average). Cost of operation at 90° room temperature with an average temperature of 43° inside box, $1.11 per month (15.7 cents per cu. ft. per month), above average. This would correspond to approximately 83 cents per month with an 80° room temperature. With temperature control set at *10* (coldest position), time required to freeze ice cubes: 2 top and 1 large bottom trays, about 3.2 hours; middle trays, 6.6 and 8.4 hours (poor). Motor ran about 91% of the time during freezing period. Temperature in cabinet during cube freezing period, maximum 50.5°, minimum 26.8° (too low). 3

Norge, Model LFN 747 (Norge Division, Borg-Warner Corp., Detroit) $299.95. Total rated capacity, 7 cu. ft. (actual, 7.1 cu. ft.). Rated shelf area, not stated (actual, 12.4 sq. ft.). Compressor, sealed type. Condenser, finned-tube type mounted diagonally at rear of machine compartment and cooled by natural circulation of air through a duct at rear of cabinet. Refrigerant (type not stated), controlled by a capillary tube. Freezer compartment (storage capacity, 0.9 cu. ft.), located at top right-hand side of food compartment and divided into 2 sections. Upper section refrigerated on 2 sides and beneath and contained 1 refrigerated shelf; lower section refrigerated at top and bottom and divided into two parts by a refrigerated shelf. Four ice cube trays to make 56 cubes (7¾ lb.) of ice. A synchronous electric clock was mounted on the door of non-refrigerated storage bin which operated a switch providing automatic defrosting (an "on-off" lever permitted disconnecting the device). A jar made of plastic placed below a hole in the drip pan was provided to collect the water from the defrosting operation. Time required to lower average temperature to a stable value (36.6°) with control at *5* and room temperature of 90°, 7 hours (better than average). Cost of operation at 90° with an average temperature of 40.4°[1] inside box, $1.04 per month (14.7 cents per cu. ft. per month), about average. This would correspond to about 78 cents per month with an 80° room temperature. With temperature control set at coldest position, time required to freeze 1 tray, 2.9 hours; remaining 3 trays, 6.9 hours (poor). Motor ran continuously during freezing period. Temperatures in cabinet during cube freezing period, maximum 54° (too

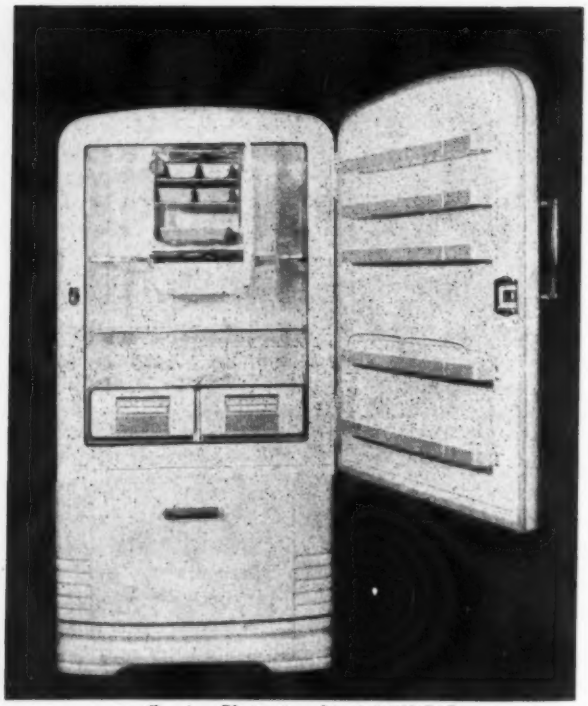
[1]The standard inside average temperature of 43° could not be obtained.

★★★

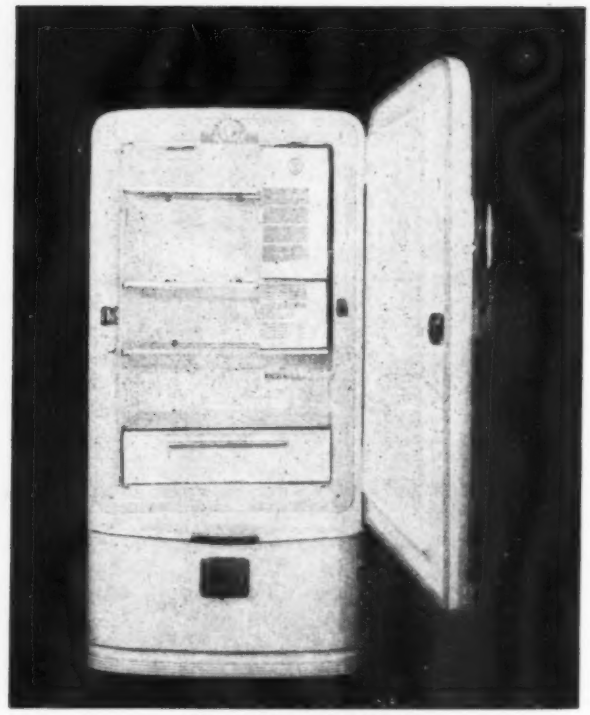


Philco, Model A-731

Coolerator, Model DR-85



Crosley Shelvador, Model SE 747



Norge, Model LFN 747

★★★

high), minimum 27.8° (too low). In this refrigerator, the *warmest* setting of control gave too low an average temperature (40.4°). Somewhat more noisy than others in operation. There has been some indication that recent *Norge* refrigerators have not been standing up in service as well as they should. **3**

SUMMARY OF TEST DATA OBTAINED ON REFRIGERATORS RECENTLY TESTED

Refrigerators Not Loaded (Food Not Taken Out or Put In)

	1 Actual capacity in cu. ft.	2 Average temperature inside box (corrected to standard conditions) At room temperature of: 90°F	3 110°F	4 Percent Running time of motor at 90°F	5 110°F	6 Time for making maximum quantity of ice cubes, hours at 90°F	7 Energy, kilowatt-hours per day at 90°F	8 110°F	9 Cost of operation per month at 3½c per kwhr. at 80°F	10 90°F	11 110°F
Norge LFN 747	7.1	40.4	44.7	36.6	62.7	6.9 (7.76 lb.)	0.99	1.78	$0.78	$1.04	$1.87
Philco A731	7.1	43.0	46.0	22.5	50.0	2.9 (7 lb.)	0.98	2.04	0.77	1.03	2.14
Crosley SE 747	7.1	43.0	46.0	25.0	55.5	8.4 (10.5 lb.)	1.06	2.03	0.83	1.11	2.13
Coolerator DR-85	8.3	43.0	46.0	25.0	63.0	3.36 (9.7 lb.)	1.25	2.80	0.98	1.31	2.94
General Electric BH7-A	7.2	43.0	46.0	20.7	43.0	2.4 (7 lb.)	0.77	1.47	0.61	0.81	1.54
Coldspot Four Star	7.8	43.0	46.0	22.5	40.0	4.9 (8 lb.)	0.92	1.72	0.73	0.97	1.80
Kelvinator CD-7-R	6.8	43.0	46.0	24.0	52.0	7.0 (7 lb.)	0.96	1.85	0.75	1.00	1.94
Monitor 746	7.3	43.0	46.0	23.5	48.0	6.9 (10.5 lb.)	0.99	1.83	0.78	1.04	1.92
MW De Luxe 696	7.1	43.0	46.0	25.5	48.5	4.8 (7 lb.)	1.10	2.00	0.87	1.15	2.10
Hotpoint 12EC8-1	7.7	43.0	46.0	22.5	46.5	4.5 (7 lb.)	0.87	1.82	0.68	0.91	1.91

Listings within black lines refer to refrigerators reported in previous Bulletins.

A Poisonous Chemical Used in Processing of Flour

Recently the Journal of the American Medical Association and some newspapers have given attention to a report by an English physician concerning adverse effects found to occur in dogs that were fed bread made from flour containing *nitrogen trichloride.*

For the past 25 years or more, a large proportion of all white flour sold in this country and in Britain has been treated with chemical bleaches or "improvers"; many of the substances used have both effects. Bleaching permits use of low-grade flours which otherwise would be unacceptable, and possibly permits them to be mixed with better grades without detection. Improvers, in the language of flour millers and bakers, are said to give "strength" to flour; the properties included under this term are:

a. quantity of water absorbed per unit of flour in mixing dough
b. quantity of bread per unit of flour
c. physical extensibility of the dough
d. capacity to make large well-rounded loaves

It is evident, therefore, that the use of the term "improver" is misleading, for the advantages of the effect produced are advantages to the baking industry, giving the consumer an attractive snowy white loaf of bread containing the least practicable amount of flour. Water, much of which remains in the bread after baking, is by far the cheapest ingredient that enters into bread, and from the baker's standpoint anything that permits the flour to absorb and hold more water is a great economic advantage. There is no suggestion that anything is added to the nutritive value of the flour by "improvers"; most persons who have eaten bread made from untreated flour declare it to be more "tasty" than that made from bleached or otherwise "improved" flour.

Unfortunately, too, the action of improvers is open to criticism on the ground that some of the nutritive value of flour is destroyed. The bleaching action is essentially the oxidation of carotin to a colorless substance, and consequent loss of vitamin A content. Dr. A. P. Luff, writing in *Lancet* in November 1934, states that chlorine, nitrogen trichloride, benzoyl peroxide, and nitrogen peroxide all produce detrimental chemical changes in flour, but his objection to the bleaching of flour is principally on the grounds that it necessitates removal of the germ and some other edible portions of the wheat grain that contain vitamin B. The present procedure of removing vitamin B by "improving" the flour, and subsequently "enriching" it by addition of synthetic vitamin B may seem a queer procedure to thoughtful consumers. From the point of view of the miller and the baker, however, removal of the germ is advantageous, since the removal delays spoilage and permits keeping flour in storage longer to await a favorable price.

In addition to impairing the nutritive value of flour, there is evidence that many, and perhaps all, substances used either as bleaches, as improvers, or both, may have toxic effects. Among the substances so used are:

acid calcium phosphate, ammonium persulfate or potassium persulfate, benzoyl peroxide ("Novadel"), chlorine, chlorine and nitrosyl chloride ("Beta Chlora"), nitrogen peroxide (Alsop process), nitrogen trichloride ("Agene"), potassium bromate.

All of these chemicals have been used to some extent. The millers piously state that there is no definite proof that any of them have a toxic effect on human beings; they have assumed that the flour treatments are quite harmless. It may be worth noting that arsenic, lead, and strychnine and many potent drugs can be ingested by human beings in small amounts without fatal results, but that is a long way indeed from proving them to be safe or desirable additions to food, especially to food that is consumed in considerable quantities daily, for a lifetime. From the beginning of CR's work, it has been our position, in considering commercial manufacture of foodstuffs, that there should be unequivocal proof, *before* any potentially toxic or even unfamiliar substance is added to food, that the addition can have no possibilities of causing a toxic or otherwise harmful effect upon the consumer.

In 1927 a Departmental Committee of the British Ministry of Health investigated at great length the use of various substances commonly added to flour. They stated that "there can be no suggestion that their use contributes anything which is normally present in flour," and found reason to believe that use of chlorine or nitrogen trichloride might alter the composition of flour unfavorably; they regarded acid phosphate as the least objectionable. Their opinion [emphasis ours] was stated as follows:

"The object of maintaining inviolate the purity of the flour supply we regard as inspired by a sound instinct and we think that the responsibility for relaxing the

principle is a very grave one, particularly at a time when research is beginning to throw new light upon the existence and properties of the more subtle constituents of the foodstuffs. ******** Our view then is that *flour should be the product of the milling of wheat without the addition of any foreign substance.*"

In the December 14, 1946 issue of the British Medical Journal, an epoch-making announcement was made. Sir Edward Mellanby, an eminent and highly skilled researcher in nutritional questions, reported that canine hysteria was produced in dogs when they were fed bread made of flour that had been bleached and otherwise "improved" by treatment with nitrogen trichloride, better known by its trade name *Agene*, whereas bread made of untreated flour had no such effect. The same effect produced by feeding bread to dogs was noted by other investigators as early as 1937, but they did not carry the experiment to the point of testing the effects of both bleached and unbleached flours, and therefore failed to recognize the exceedingly important specific effect of nitrogen trichloride.

During the early part of 1947, another group of investigators representing the United States Army conducted a series of experiments; their work confirmed Dr. Mellanby's results. They refer to the disease as "canine epilepsy" because of its remarkable resemblance to human idiopathic epilepsy (idiopathic: self originated, or of unknown causation). Their experiments and those made by other groups have added cats, ferrets, monkeys, rabbits, and rats to the list of animals in which abnormalities are produced by eating flour treated with nitrogen trichloride. The Army group states that it agrees with the 1927 report of the Departmental Committee of the British Ministry of Health, from which we have already quoted.

The Army group recommends also that, because the *Agene* process is only 25 years old, considerably below the average human life span, particular attention be directed to those diseases that have increased in incidence during that period. "Primary emphasis should be directed toward diseases having a neurologic component, such as duodenal ulcers, schizophrenia, and disseminated sclerosis."

Professor Emeritus Anton J. Carlson, distinguished physiologist of the University of Chicago, suggests the possibility that nitrogen trichloride may cause subclinical disorders of the nervous system, and might push potentially unstable personalities over the line. He also states his belief that the substance is responsible for nervous excitability that could lead some unstable persons to seek relief in excessive use of alcohol.

The Food and Drug Administration considers that it lacks authority to forbid further use of nitrogen trichloride unless and until definite proof of its toxicity to humans is established. It has, however, gone so far as to recommend that its use be restricted to a minimum and that it be discontinued entirely as soon as an alternative process can be developed. It does not, however, explain *why* any alternative process must be devised and used.

A milling trade bulletin says: "The thing we fear most is that the furor over agene may result in putting all flour bleaching and maturing treatments on the defensive, and start the food faddists on a campaign to eliminate all of them." In CR's opinion, such a campaign would be fully justified. CR does not consider the term "faddist" fairly applicable to a person who objects to having his food adulterated with chemicals which impair its nutritive value, and which may cause illness or injury to the body's processes or functions. Most, and probably all, the known methods of bleaching or "improving" flour have been subjected at one time or another to severe criticism by qualified physicians and physiologists, and their toxicity or lack of toxicity is just as much in doubt as is the case with nitrogen trichloride. The persulfates, for example, are known to be the cause of an allergic disturbance known as "bakers' itch"; a substance that can cause trouble to the skin may reasonably be suspected of being harmful to the alimentary tract if taken internally. Even nitrogen peroxide, which some investigators have considered the least harmful, or potentially harmful, of all the commonly used "improvers," has been found to leave nitrites in the flour. Nitrites are not harmless; indeed, they are used by physicians as potent drugs for modifying the tonus of arterial muscle and producing fall of blood pressure.

Commercial considerations often have encouraged the use of substances of doubtful harmlessness. However, from the ultimate consumer's standpoint there is no certainty that there is a net economy in the savings of production costs, etc., which such substances make possible, when medical costs and loss of health and vigor of consumers that may be implied are considered. It is CR's position that there is no excuse for adding to foods, substances that have not been proven to be without toxic or other deleterious qualities. Such proof has not been forthcoming for any bleach or flour "improver" now in use. Because bleaches and "improvers" are essentially oxidizing agents, which as a rule *change radically the chemical structures of substances to which they are added*, their effects should be investigated rigorously in every case before they are allowed to be put into food. Failure to forbid the use of any such substance merely because it has not yet been proved to have poisonous properties reflects a clearly inadequate and unscientific attitude toward protection of the public interest. It is the responsibility of the Food and Drug Administration, the medical profession, and the nutritional research groups in the universities to see that in future the process is

worked in a rational direction, namely, to eliminate the possibility of harm *before* the doubtful or untried substance is utilized in manufacture. Unless this is done, we shall have a new "improver" for flour, and perhaps another long period will elapse before it is learned that this new or newly applied substance has elements of continuous hazard to the whole population.

As the British committee so clearly apprehended, in making its comment on the need for vigilance regarding purity of flour, there should never be permitted to be any doubt in the case of a foodstuff of large and universal consumption, such as flour and breadstuffs, regarding the safety and harmlessness of every material, utensil, and process used.

Five Phonograph Pickups

NOT all consumers expect the same thing from a phonograph pickup, and the satisfaction which a user derives depends to some extent upon his individual taste. That, in turn, depends upon the range of tones to which his ear is responsive, upon the amount of needle scratch which he finds tolerable, and upon his preference for emphasis or attenuation of either the bass or the treble range.

Needle scratch for a specific pickup can be decreased by use of a scratch filter, but only at the expense of attenuating (reducing the loudness) of frequencies above about 3500 cycles per second. For mechanical reasons, it is necessary to cut records in such a way that all the tones having frequencies below about 250 cycles are weakened, and the records are, accordingly, "undercut" in that region; this makes it vitally important that for good reproduction, a good reproducing system (pickup, amplifier, and loud-speaker) have such characteristics that the reduction in bass response engendered in cutting the record is compensated. At the high frequency end of the scale, a reproducing system should theoretically be capable of reproducing equally all frequencies up to about 16,000 to 20,000 cycles to accommodate the full range of the human ear; actually, because records available do not reproduce tones above about 8500 cycles, and usually show a progressive loss starting at about 5000 cycles, the ability of a pickup to reproduce the very highest frequencies of the audibility range is unimportant. Equalization of upper or lower frequencies, or both, is nearly always necessary. For this to be effective successfully, it is important that a pickup should have a smooth response curve, with neither accentuation nor attenuation of frequencies over narrow regions of frequencies.

Pickups using crystals constituted an overwhelming proportion of the pickups produced because of their much lower cost and the fact that they do not require the fairly expensive accessory of a preamplifier.

Unfortunately, no type of needle combines low wear on the record with optimum quality of reproduction. Steel or chromium needles, preferably used only once and then discarded, are the least destructive to records, while the semipermanent jewel-tipped needles give best reproduction but wear out records most rapidly. The so-called *precious metal* needles occupy an intermediate position. (The CR BULLETINS for March 1946 and July 1947 discussed and summarized the amount of wear produced by needles of different types.) With any type of needle, it is important that needle pressure be low, but there is a lower limit beyond which needle pressure cannot go, particularly where a record changer is used.

Pickup Cartridge Only

A. Recommended

Pickering, Model 120M (Pickering & Co., Inc., 29 W. 57 St., New York 19) $15. Magnetic type. Frequency response without equalization was deficient in the bass, but with equalizing amplifier supplied by the maker, was excellent over the entire range and equivalent to the performance of the costly *Pickering 161M* (reported in the April 1947 Bulletin). Addition of a scratch filter removed needle scratch but necessarily produced severe atten-

uation of frequencies above 4000 cycles. Instructions did not specify needle pressure; a pressure of 1 oz. was used in tests, but it was found that tracking would be satisfactory down to ⅓ oz. when the motor board was shock-mounted. Distortion was quite exceptionally low—below the amount measurable by the instruments used. Output was 0.04 volt, insufficient to drive a conventional phonograph amplifier; addition of the equalizing amplifier, however, raised the output to about 2 volts. Noise output low, as pickup was not responsive to up-and-down motion of the needle. Direct needle noise as low as for any of the pickups reported, and comparable with that of *General Electric* and *Brush* pickups reported in the November 1946 Bulletin. The needle is jewel-tipped; this, when it wears, cannot be changed by the user but must be returned to the manufacturer; reconditioning charge, $4.50. Gave fine reproduction over the entire frequency range; because of surface noise, high-frequency attenuation will be necessary in the playing of shellac records, as with all high-fidelity pickups. ¶This pickup works directly into grid circuit, without requiring input transformer. **3**

B. Intermediate

Astatic, Model QT-M (Astatic Corp., Conneaut, Ohio) $5.34. Crystal type. Tested installed in *Astatic 508* arm. Because no equalization was mentioned in instructions furnished, test was made without equalization and with a metal-tipped needle. Response curve similar to those of the manufacturer's *Nylon 1-J* and *L71* types. Bass response was considered somewhat deficient; some attenuation of high frequencies. Distortion about 1% below 2000 cycles and nearer 2% at higher frequencies. Needle pressure adjusted to 1 oz. gave satisfactory results. Output was 0.5 volt, probably adequate for most phonograph amplifiers. Noise output (needle hiss) in loud-speaker was low; direct needle noise, very low. This pickup had the advantage of using a removable needle, either metal-tipped or jewel-tipped, replaceable by the user. Listening tests indicated that reproduction was similar to that obtained from the *Astatic Nylon 1-J* and *L71* pickups; should be satisfactory for the home record player. **2**

Magnetostriction Pickup (Magnetostriction Devices Co., 739 Boylston St., Boston 16) $10. Magnetic type. Tested installed in *Astatic 508* arm. Frequency response was nearly identical with that of test record except for slight attenuation of frequencies above about 2500 cycles. Bass response considered deficient and hence requiring equalization of the usual type. Distortion varied from a low value, less than a measurable amount, to about 3%. Needle pressure recommended by the manufacturer was 0.5 oz., but because no arm was available affording this low pressure, tests were made with pressure of 1 oz. Output was 0.0025 volt, a good deal below the value required to drive the usual phonograph amplifier without preamplifier. Noise in the speaker, low. Direct needle noise as low as in any pickup reported here. This pickup used a metal-tipped needle that was not replaceable by the user. Cartridge was accompanied by an adapter designed to hold it in a conventional pickup arm. In listening tests, high frequencies were undistorted, but bass frequencies were muffled and less clear than those from *Audax* or *Pickering* cartridges. **3**

Grunsky Pickup. This was a crystal pickup in the developmental stage, which was tested because of some rather remarkable claims which the designer made for it. Information supplied did not recommend a load, but when used with the 200,000-ohm load, the results checked the maker's claim that no bass equalization was required. There was some attenuation of frequencies above 1000 cycles, despite the maker's claim of a rising characteristic, and distortion was present over the entire frequency range, varying from 1% to 3%. Needle pressure was not specified. When 1 oz. was used, output (unusually large for pickup of such even response) was 0.32 volts, enough to drive phonograph amplifier without preamplifier. Noise output in speaker relatively low. Direct needle noise as low as any other pickup so far reported. Jewel needle supplied. In listening tests, gave brilliant high-frequency response and good bass without equalization. Since the cartridge was not a production model, its rating is to be understood as tentative; if production samples perform as well, an *A* rating would be warranted.

Pickup Complete with Arm

B. Intermediate

Audak, Model R-61 (Audak Co., 500 Fifth Ave., New York 16) $29.85. *Tuned Ribbon*—magnetic type. Response curve using a standard test record, when tests were made using load specified by manufacturer, was substantially identical with that claimed by manufacturer except for slight attenuation of the upper frequencies. Bass response considered deficient and hence requiring equalization. Harmonic distortion about 1% at middle frequencies and about 3% above 4000 cycles. Needle pressure very close to 1 oz. Output was 0.013 volt; when matched to a high input impedance by a matching transformer, the output would suffice to drive a phonograph amplifier without further amplification. Noise output in speaker, very low; direct needle noise, higher than that of the other pickups reported in this test. In listening tests, high-frequency output sounded undistorted, but the bass frequencies were muffled and not heard as clearly as with *Pickering* cartridge. Jewel-tipped needle changeable by owner. **3**

Exposure Guide

Eastman Kodak Circular, *Snapshots Exposed, An Easy Guide for Outdoor Pictures with Kodak Verichrome and Plus-X Film* (bearing the number 7713-7-47-CH in small type on the reverse side) is available free from photographic stores. This folded leaflet seems to serve every purpose that would be served by an exposure meter for amateur work, when Verichrome or Plus-X film are used. (With Super-XX film, the exposures given should be halved.)

Three Automatic Dishwashing Machines—Final Report

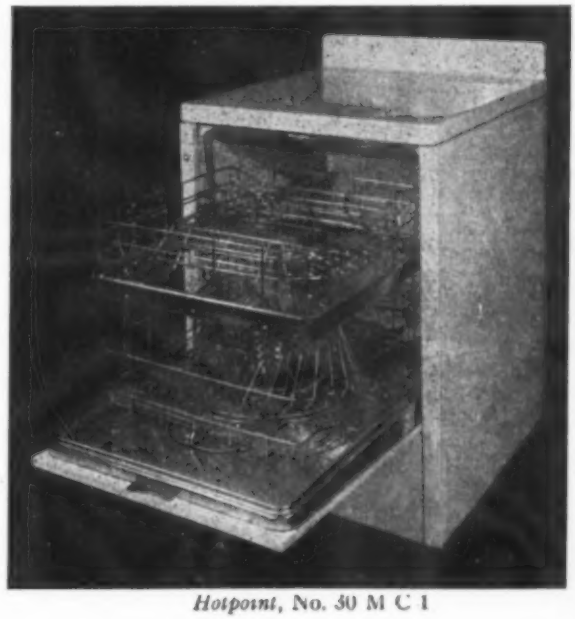
SINCE the report on dishwashing machines appeared in the October 1947 BULLETIN, a *Hotpoint* and a recently manufactured model of the *Dishamatic* were obtained and tested. Further tests were also made on the *General Electric*, using water at a higher temperature than in the original test. At the conclusion of the laboratory tests, all three of the machines were installed in a private home. There, each machine was used to wash the dishes of a family of four for at least a month. The conclusion reached from these tests was that for an average or large-sized family, an efficient automatic dishwasher is a useful appliance *provided* an adequate supply of hot water is available. Its advantages are: (1) It saves time and eliminates to a large extent a chore which is distasteful to many housewives. (2) "Dishpan hands" are no longer much of a problem. (3) Dishes are washed at much higher temperature than is possible with ordinary hand methods and thus are cleaner and, if the temperature of the water is high enough, less likely to carry disease germs. A dishwashing machine of the best type will eliminate use of dishcloths; these, when used over and over, become loaded with germs that are bound to be transferred to the dishes.

It should not be assumed that any of the machines tested do a strictly first-rate job, but the best of them will wash dishes in a way that, it is believed, will meet with the approval of the majority of housewives. Pots and pans will often require some scouring by hand. Silverware washed in an automatic dishwasher will require an occasional thorough cleaning by hand; coffee cups also will require scouring to remove a brown stain which builds up in time.

The manufacturers of all of the machines recommended the use of *Calgonite* as a detergent, which is expensive. The cost of the detergent will perhaps surprise many new users of dishwashing machines, for when used in the amount recommended by the manufacturers, the outlay would amount to approximately $1.50 per month for the *General Electric*, and $1.25 to $2.50 per month for the *Dishamatic* and *Hotpoint*, assuming dishes were washed after each meal. There is always a cost for soap in washing dishes by hand, but since in most homes soap is used for several purposes, the housewife would not ordinarily be conscious of the expenditure per month for soap or other detergent used in her dishwashing.

Other than as to the detergents used, the cost of operation of the *General Electric* and *Hotpoint* were relatively small, but in the *Dishamatic*, which had a built-in electric water heater, the cost of operation was high, $4.50[1] a month with the machine connected to the cold water supply as recommended by one large New York City department store on the ground that it "doesn't drain the hot water tank." (This recommendation does not seem well advised, since the cost of heating water by electricity in the machine will be very much higher than the cost of heating water by a regular electric household storage tank water heater in the ratio of about 2 or 3 to 1.) The manufacturer's advice on this point was to connect the machine to either the hot water or cold water supply, but his instructions did

[1]For actual cost of coperation—not all an added cost—to determine that, cost of heating water used for dishwashing by hand would be deducted



Hotpoint, No. 50 M C 1

not include any information to the consumer that would tend to warn him of the high cost of heating water by electricity when a low off-peak rate is not obtained (as it would be in cases where the customary 50-gallon or larger electric water heater and storage tank is used). If connected to the hot water supply, cost of heating the water would be materially reduced.

Health authorities often require that, in dishwashing machines used for commercial purposes, the dishes must be washed and rinsed in water at not less than 170° to 180°F for two minutes, to provide adequate disinfection against bacteria. The *Dishamatic* met such requirements. The built-in heater used for dish-drying, in the *Hotpoint*, did not raise the temperature of the dishes sufficiently to meet the above requirement. (Temperatures attained during the final drying cycle did not exceed 130° to 150°.)

All of the machines reported were fully automatic after they were loaded and detergent added. In the *General Electric* and *Hotpoint* the duration of each operation was fixed, and could not be changed. In the *Dishamatic* the operator could shorten the length of each operation by adjusting the dial; when this was done, however, results were inferior to those obtained when the machine was permitted to run for the full 30-minute period.

A. Recommended

Dishamatic, Model C-2 (Lake State Products, Inc., Jackson, Mich.) $274.50. Information from the manufacturer indicated that the machine has been improved in a number of ways over the model reported in CR's August 1947 Bulletin. One change is the use of cams made of solid plastic in the timer, which is supposed to eliminate some irregularities in the cycle. A change has been made in the control valve to increase accuracy of quantity of water used, and the electric heater provides water of much higher temperature (now about 184°, desirable, see text)[1] than in the model originally tested. Amount of water used, approximately 2.5 to 2.7 gal. Complete cycle was as follows: wash, 14.5 minutes; drain, 0.4 minute; rinse, 5.2 minutes; drain, 0.4 minute; dry, 9.9 minutes; total, 30.4 minutes. The *Dishamatic* did an excellent job in both washing and drying dishes, and was judged by CR to be unquestionably the best of the three machines reported in this article. (There was no evidence of cooking or heat-hardening of some types of food soil due to the high temperature of the water.) On tableware (knives, forks, spoons, etc.), it did not do as good a job as either the *General Electric* or the *Hotpoint*, even though extreme care was taken to keep large dishes and plates at the rear of the machine to avoid blocking off the spray from the baskets containing the silverware. Capacity somewhat less than that of *General Electric* and *Hotpoint*. Power rating, 1700 watts. Energy consumption per day for 3 dishwashings and maintaining water at correct temperature continuously, approximately 4.3 kilowatt-hours or $4.50 per month, at the typical rate for electrical energy of 3½ cents per kwhr. This would be reduced slightly (by about 50 cents per month if connected to hot-water supply) by plugging in the machine about ½ hour before each use and disconnecting it when the machine shut off at the end of the cycle.

B. Intermediate

General Electric, Model BE-646 (General Electric Co., Bridgeport, Conn.) $224.50 (price before a recent price change). Inside dimensions of dish compartment, 20 x 20 x 16 in. deep. Amount of hot water used, 4.9 gal. Complete cycle was as follows: pre-rinse, 0.6 minute; wash, 5.1 minutes; drain, 0.9 minute; rinse, 1.0 minute; drain 0.8 minute; rinse, 0.9 minute; drain, 0.6 minute; total, 9.9 minutes. Energy consumption for 3 dishwashings per day, about 7 kwhr. or 25 cents per month, not including cost of detergent or hot water. Cost of hot water would run from 60 cents to $1.90 per month, more if the water used is heated to 160°F. Previous tests of this machine were made with the hot water supply at approximately 140°F. Results on both dishes and silverware were much better when the temperature was increased to about 160°F. Glasses, however, were clean but not dry, as moisture in the form of water droplets was trapped in the top half of the glasses, necessitating wiping and polishing by hand.

C. Not Recommended

Hotpoint, No. 30 M C 1 (Hotpoint Inc., Chicago 44) $284.50. Inside dimensions of dish compartment, 20 x 21 x 19 in. high. Wire dishracks were essentially the same as *General Electric* in both size and shape. The dishracks are fitted with wheels, and for loading are rolled out onto the inner surface of the door, which opens downward to a horizontal position. Dishracks stop suddenly when pulled out or pushed in, which was found in some cases to cause breakage of fragile dishes, cup handles, etc., unless the operator uses extreme care. Detergent is placed in a receptacle in inside lower portion of door. Complete cycle was as follows: start, 0.5 minute; spray rinse and drain, 0.5 minute; wash, 5.5 minutes; drain, 1.0 minute; rinse, 5.5 minutes; drain, 1.0 minute; rinse, 1.5 minutes; drain, 1.0 minute; rinse, 1.5 minutes; drain, heater and fan drying, 20 minutes; heater drying, 10 minutes; total, 48 minutes. Energy consumed per cycle, 542 watt-hours when water at 20 lb. per sq. in. (static) pressure was used; 585 watt-hours when water was at 40 lb. per sq. in. pressure. If machine were used 3 times per day, cost of electrical energy required per month at 3½ cents per kwhr. would amount to $1.70 to $1.85. Amount of hot water used per cycle, 6.2 to 8.6 gal. depending on water pressure, at a cost of from 75 cents to $3.30 per month. Efficiency of dishwashing depended upon the pressure available; results at 20 lb. per sq. in. (static) were poor; and results at 40 lb. were only fair. Built-in heater for drying raised temperature of dishes to a maximum of about 150° but dishes and glasses were not completely dry at end of cycle. Condensed steam emerged from small grille in front of door and dripped to floor. This would be an annoyance to the housekeeper.

[1] Life of such a heater tank is short, due to high water temperature.

Soapless Cleaners and Detergents

Nature of Soil

DIRT OR SOIL is a combination of water-soluble materials—which can be easily rinsed away and therefore offers no real cleaning problem—associated with insoluble substances such as lint, dust, soot, some types of proteins, and oily matter, which have to be wet, loosened, and then removed by mechanical friction or rubbing. These non-soluble materials are what make cleaning difficult, particularly the oily matter, itself complex and more or less sticky and adherent, causing solid and sooty soil to cling to fabrics and to smooth surfaces. The problem of cleansing, then, is to remove more or less oily particles of dirt.

Nature of Cleansing Action

In order for a solution of soap or synthetic detergent to remove soil, it must first wet it. Because of the oiliness present, plain water does not do this. The next requirement is that the soil be separated into small particles dispersed throughout the detergent solution, and prevented from coagulating into clumps which might settle again on the cleaned articles. A good detergent like soap is high in *wetting power*, in *ability to emulsify oil*, and in *dispersing power* — the ability to suspend solid particles and prevent their redeposition.

Besides true synthetic detergents having properties similar to those of soap, many commercial soapless cleaners contain alkaline salts; in fact, a number contain alkaline salts only. Alkaline salts, as well as simple alkalis, have the property of neutralizing acid. Alkaline salts neutralize the acid present in soil, an important factor which makes them extremely useful as soap "builders" (materials that increase the cleansing action of a detergent) — but this is less important with synthetic detergents. Soil also commonly contains saponifiable fats and fatty acids. The alkali reacts with these to form soap. Even though the amount may be only a trace, this soap is extremely effective in cleaning because it is formed *within the dirt itself.*

Editor's Note:

THE topic of synthetic detergents (soap substitutes) has gotten to be so important from the consumers' standpoint that we felt it was in order to present a fairly complete discussion of these new materials and their effectiveness as cleaning agents as compared with soap. A second article will discuss further aspects of the problem, and will also present in tabular form brief statements of chemical analyses of both granular and liquid preparations.

One of the most important things learned from this study is that the manufacturer does the consumer great disservice by not telling the amount and kind of the synthetic detergent in his product. To be of greatest use, the package should indicate the type of detergent and how much builder and alkaline salts are present. Then the consumer could tell if it would be suitable for washing woolen blankets, for example, or whether it would be of a type useful for washing cottons, or relatively inefficient for that purpose.

Using Hard Water May be Expensive

This involves not only additional labor in cleaning, but increased cost. It has been estimated that if the amount of soap required per family per year in strictly soft water costs $1.65, the cost with water of 10-grain hardness or 170 ppm. (parts per million) would be $9, and with water of 35-grain hardness or 600 ppm., $28.50. [1][1] (The last value for hardness is extreme and not likely to be found in practical use.) Probably an average figure more or less representative of the hard water of the country would be 10 grains or 170 ppm. General cleaners should therefore clean efficiently in water of at least this degree of hardness.

Synthetic Detergents

Synthetic detergents were originally developed, not because of a scarcity of soap, but to overcome its disadvantages. While soap is the best possible general cleaning agent in soft water, it is not so good in hard water. The calcium and magnesium salts which make the water hard give soft gummy

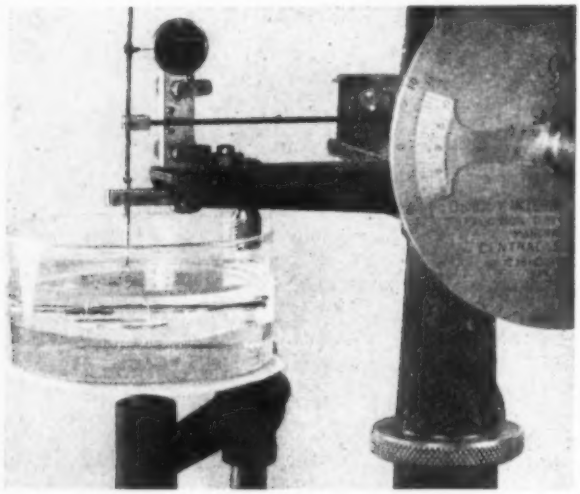
[1]Numbers in brackets refer to references at the end of the article.

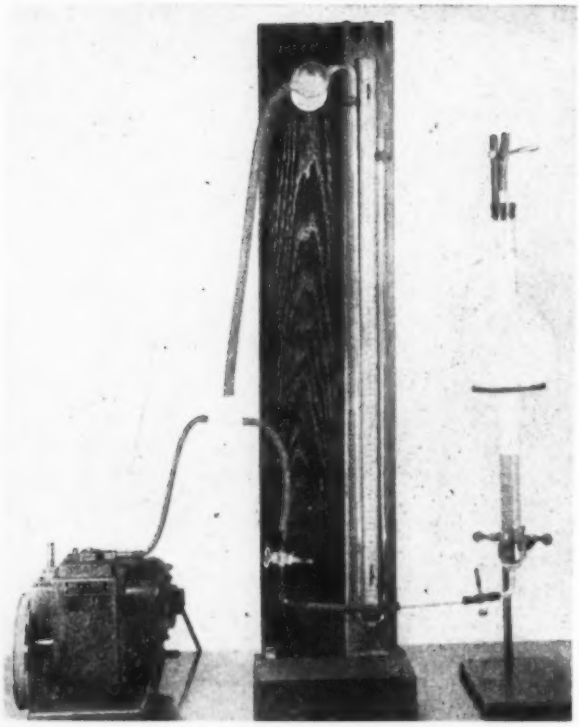
precipitates by reaction with soap, which stick to the article being cleaned and are as difficult to wash off with excess soap as is the original soil itself. This means that when used in hard water the first part of the soap added is consumed in softening the water, and only after the water is softened will the amount left over do the cleaning for which it was intended.

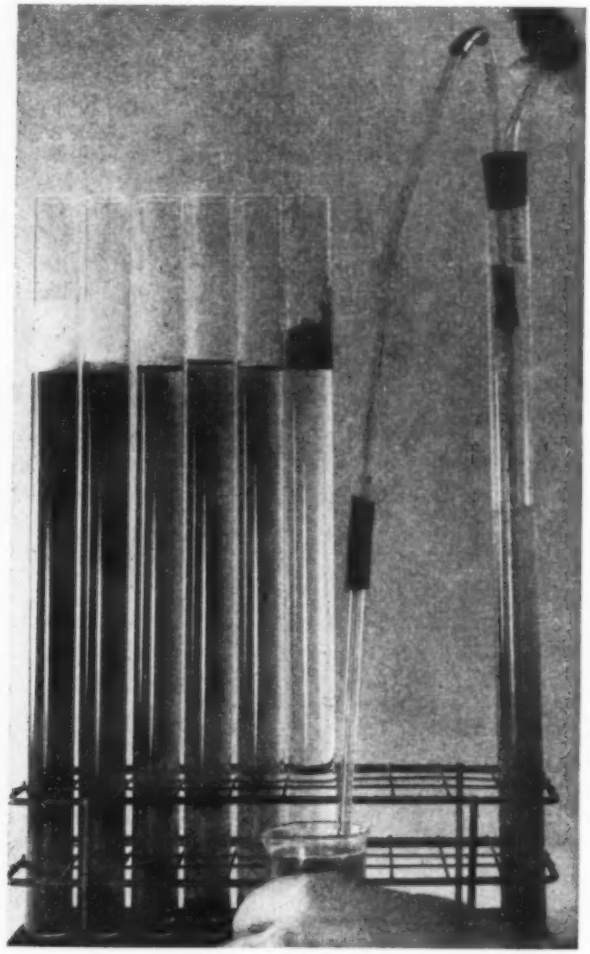
Two synthetic materials now commercially available for use by the public have proved their worth as detergents. One or another of these is incorporated in many of the soapless cleaners now on the market. They are shown in the table (to appear with Part II of this article) according to chemical type as "sulfonated," and "sulfated."

The Sulfonated Detergents

What is referred to here as sulfonated is called by the chemist an alkyl aryl sulfonate. This is produced in greater volume than the other type and is made from less expensive starting materials, namely a petroleum fraction, and benzene (not benzine) from coal tar. Although it is more resistant to hard water than soap is, still the calcium and magnesium reaction-products are fairly insoluble and will precipitate in very hard water of 300 ppm. hardness. This precipitate differs from that of soap in being non-sticky, and







Three Techniques for Studying Surface-Active Agents

Above — *Laboratory set-up for measurement of dispersing power of a detergent.*

Upper Left — *The duNouy tensiometer, an instrument for measuring the interfacial tension of surface-active solutions.*

Lower Left — *Measurement of foaming power.*

rinsable. Sulfonates are stable in hot water and in acid solution. The mild acidity encountered in soil will not decompose these, although it will decompose or use up soap to some degree. The synthetic is a much better cleaner in cold water than ordinary soap is.

Sulfonates in practice are "built" with an inexpensive neutral salt, sodium sulfate, some of which is inherently present because of the method of manufacture. Up to 60% of sodium sulfate is used, combined with the organic sulfonate. This greatly reduces the cost, so that in large-scale production this detergent should be competitive with soap in price per pound and even offers a possibility of being less expensive.

The alkyl aryl sulfonate is much more soluble than ordinary soap, and by certain additions its solubility can be made to approach that of liquid soap, such as special soaps used in shampoos. Though the sulfonate foams strongly, its lather is not as lasting as that of soap. It possesses a mild bactericidal action, much more than soap, whose bactericidal effect is slight.

A disadvantage of the sulfonate is that it has a yellowish color — not a real defect, but users often like the appearance of white soap powders better. Also it tends to give off an odor resembling that of kerosene, especially when dissolved in hot water. However, this is more pleasant and less harmful than the fumes from ammonia or from several non-flammable spot removers which contain carbon tetrachloride; and the sulfonate is non-toxic.

The sulfonated detergent has been recommended for washing wool garments; controlled experimental studies show that it washes woolens to the same degree of whiteness in one-sixth the time required for soap. [2] The best concentration is 0.2%. It is important both for efficiency and economy to use the right concentration. The longer wool is washed, the more it felts or mats together. This, of course, is a good reason for finishing up the washing of woolens as quickly as possible, and shorter washing periods make for softer and fluffier materials.

As to cotton, the sulfonated detergent washes cotton more slowly than soap does and is not as effective as soap in soft water. In hard water we have a different condition; there the synthetic can be used alone. For soap to be effective the water must be softened by some means, either by the use of excessive amounts of soap or preferably by the addition of special softening agents.

The Sulfated Detergents

The type of synthetic detergent referred to as "sulfated," in the table which is to appear with the second part of this article is called an alkyl sulfate. This is produced in smaller volume than the sulfonate and costs two to three times as much. As with soap, the starting materials are natural fats and oils; in the case of the synthetic this is commonly coconut oil. The synthetic sulfates are necessarily more expensive to manufacture than soap and would therefore command higher prices.

As with the sulfonate the sulfate can be built with the inexpensive salt, sodium sulfate, to the extent of 60%, that is 40% alkyl sulfate and 60% sodium sulfate.

The synthetic sulfated detergent possesses greater resistance to hard water than the sulfonated detergents. The organic sulfate itself is more soluble than the sulfonate, so that it is a very good cleaning agent even in cold water. In hot water and in acid solutions, the sulfate is less stable than the sulfonate, but the sulfate is sufficiently stable for ordinary washing in hot water. Both synthetic sulfate and sulfonate are neutral in solution.

The sulfate foams more strongly than the sulfonate and has a greater emulsifying power for dispersing oil. The shampoo, *Drene* — based on alkyl sulfate — illustrates the strong foaming and strong emulsifying ability of the alkyl sulfate. According to a study made by Jessie E. Richardson, in Bulletin 432, "Home Laundering," of the Montana State College Agricultural Experiment Station, a sulfate detergent, however, did not wash or remove certain types of soil as effectively as old-fashioned soaps, and the synthetic detergents now commercially available are less effective in washing cotton, linen, rayon, or mixed cotton-and-wool fabrics than soap.

A Third Type of Synthetic

A type of synthetic detergent not discussed so far forms the basis of *Vel*. This is stearyl monoglyceride monosulfate. This is resistant to the action of hard water, neutral in solution, is built with two parts of inorganic salt—mostly sodium sulfate—to one of organic detergent, is high in lathering power, and chemically is somewhat more closely related to alkyl sulfate than to alkyl aryl sulfonate.

References

1. D. Raymore, Soap and Sanitary Chemicals 22, No. 10, 48-9, 89 (1946)

2. L. H. Flett, Soap and Sanitary Chemicals 22, No. 12, 46-8, 167-9 (1946)

(Part II of this article with a table of widely-sold household detergents and their compositions will follow.)

Off the Editor's Chest

(*Continued from page 2*)

regardless of how much equipment he wishes to buy, can go directly to Westinghouse Electric Corp. or General Electric Co. He is forced to deal with an electrical contractor.

In the plumbing field, with few exceptions a builder *must* buy his materials from a master plumber who bought his supply from a jobber who in turn made his purchases from a manufacturer. Where this overcostly system of distribution has been circumvented in some way, as by purchases made from mail-order dealers, plumbing contractors may refuse to install fixtures which have not been purchased from them. In some cases they have been guilty of out-and-out racketeering in raising their installation charges by the amount lost in the profit on fixture sales. One contractor of Atlanta estimated that he could cut $400 from the plumbing bill of $1200 for each house if he could have purchased his fixtures in quantity direct from the manufacturers.

The story of labor's refusal to use time-saving, cost-cutting devices is now familiar to all who read their newspapers. Spray guns for applying paint that would make a saving of as much as $100 a house are banned by unions in many big cities. Even the size of the brush to be used by painters is limited in certain sections to help assure employment of unnecessary labor. Union rules, for example, have required that factory-wired switchboards and fixtures be disassembled and rewired —inefficiently, of course—on the job. Plumbers have prohibited use of motorized pipe-threaders to speed production of piping. Building labor productivity is estimated at 30 percent to 50 percent lower than it was in pre-war days. Bricklayers in Boston, for example, are reported to be laying about 300 bricks a day compared with 800 to 1000 before the war. In San Francisco, where plumbers installed kitchens and bathrooms in a five-room house in three days, before the war, they now take five days. In one case where transportation costs were to be reduced by placing cargo trailers on converted surplus vessels moving on an inland waterway, the International Brotherhood of Teamsters insisted that *truck drivers* must be paid for the time required by the trailers to traverse the 150 miles in which the cargo was waterborne. These are just random examples which can be multiplied many times. The evidence on the cost and extent of such practices is simply overwhelming, and for the most part labor leaders do not even trouble to offer a rebuttal of the charges made against them.

Prefabricated dwellings which were supposed to be the mass-production-line solution to shortages and high prices have not made an impressive showing. Inspection of actual quotations indicates that in practice the prefabricated house will not be any less expensive than one put up by an experienced builder, and this fact has gradually come to be recognized by prospective home owners. It is estimated that about three-fifths of the cost of a prefabricated house is often added after it leaves the factory. Installing plumbing fixtures is usually a costly item for reasons already briefly indicated. There is also active opposition by labor unions to the sale of "prefabs" in some sections. The Wall Street Journal quotes from a pamphlet put out by the A.F.L.'s Chicago Building Trades Council as follows:

> We must keep in mind at all times that the American home buyer is our customer and that we must protect him from investing in a temporary shelter called a home. We must use every effort to see that he gets value received for the building dollar invested.

As a result of this nobly-phrased policy, it is, reports The Wall Street Journal, impossible for the would-be home owner in Chicago to purchase a "prefab." The unions refuse to let their members work on a job that makes use of pre-glazed windows, doors with hardware attached, or prepared plumbing equipment. Building codes determined by pressures from building trade unions in many sections are also a factor in barring prefabricated houses (as well as many other economical and cost-cutting expedients in home building). The assembly line technique, however, has been used in a limited way on some large housing developments to effect economies.

The problem of how to squeeze the wastes out of the building industry and eliminate the unnecessary charges that are now being piled upon the home owner and so bring the cost of new homes down to a more reasonable figure is complex and difficult. There is a small but vociferous group that takes the position that the federal government can "fix it" by subsidizing public housing developments—apparently without any measures being taken to get at the root of the problem of excessive costs. As the thrifty consumer will readily observe, however, this is no solution at all. It merely takes money from taxpayers and expends it to put a premium on the present inefficiency and uneconomic practices of the building industry. Even public funds from taxes are not inexhaustible and cannot indefinitely keep an inefficiently-run and overpaid industry in operation. Government housing agencies have not dared to go squarely against building trade restrictions and cut through the elaborate make-work

schemes and other relationships that cause wanton waste in the building industry. Attempts which they did make, in 1946, were in the wrong direction, having to do with price controls and restrictions; these were criticized at the time as having been more of a hinderance than a help.

A more fundamental approach, one which is likely to be highly unpopular in an election year, would be to prohibit by law *any distribution charge which did not contribute an actual and useful economic service to the distribution process of getting building materials and supplies from the mill to the building site*, that did not indeed contribute an amount well above the costs which it added. Agreements between labor unions and contractors (which have been common) to restrict production or limit distribution of any item that would improve the efficiency of the job or the quality and durability of the work should be outlawed by congressional action along with labor "featherbedding" practices, all of which take heavy toll of the consumer's building dollar.

The Department of Justice might well save taxpayers money that is now being expended on its headline-getting tactics of filing impressive "trust-busting" suits based on economic and legal points of view that date back to 1910 or thereabouts, but which don't really come to grips with present-day conditions in the construction and other industries. There are plenty of monopolistic practices that may be correctly termed monopolistic and in restraint of trade that are costing consumers plenty, but the U. S. Attorney General isn't looking for them in the right places, nor is Congress providing the Attorney General's office with legislation that will permit him to move effectively against the real price-raising, consumer-bilking practices in industry. More significant still perhaps is the fact that the Department of Justice, which does ask for very large sums of money for use in prosecution of business, does not even ask for the money or powers that would be needed to proceed against some of the most dangerous and menacing monopoly powers in all industry—those, for example, exercised by the old-line building trades and transportation unions functioning either alone or in concert with other unions or with local industry and trade association groups.

★ *Notes on Foreign-Made Cameras* ★

Leica, *Rolleiflex*, and *Rolleicord* cameras are coming into the United States at intervals in relatively small numbers. *Leicas* sell at about double pre-war prices, and the *Rollei* cameras at nearly double pre-war prices. German cameras similar to the one known pre-war as *Midget Marvel* and by several other names, are offered with f:3.5 *Steinheil* and f:2 *Schneider* lenses at 50% or more above the pre-war figures.

It is now understood that the main Zeiss works have been completely re-equipped and are prepared to go into full operation as soon as the necessary personnel can be assembled and trained. A plant at Kiev, in Russia, will produce the *Zeiss Contax* camera, under the name *Kiev*. An American firm is negotiating with Russian officials and hopes to have a few *Kine Exaktas* for sale here during 1948; it is expected that lenses will be Carl Zeiss products from the Russian plant. Balda Werke also is said to be in operation in the Russian zone.

Plaubel is in operation (American zone), but its entire production is absorbed by the Army PX system.

Voigtlander is in operation, and the former American distributors are offering some models at more than double pre-war prices.

It is believed that most German cameras will come through fitted with lenses by Ludwig, Schneider, Steinheil, or Voigtlander.

The shortage of cameras in every price range appears to indicate that American manufacturers "missed the bus" after World War II by as wide a margin as they did after World War I—although one hears a rumor that the shortage has been caused by diversion of large numbers of American-made cameras to the South American markets. Whatever the reason for the shortage, it is resented by prospective buyers, who, as in an earlier epoch, may be expected to welcome any good German cameras that are offered by American dealers, if prices are within reason.

Both the Russian and the Japanese imitations of the *Leica* are available in moderate numbers, but both are said to be of inferior quality.

Inks

TO some extent, people like different qualities in the ink which they use, for in no other way can one account for the popularity of some of the shades of red, green, purple, and brown that are sold. When ink is bought for utility purposes, most people would want, above all, an intense, clean, even black or blue-black writing which would be free from the characteristic of spreading laterally or diffusing vertically through the paper. It would flow freely and not unduly corrode pens. The writing would show a high degree of resistance to mechanical and chemical erasure, and to fading when exposed to light. These relatively simple qualities are difficult to obtain and combine into a single writing fluid, although most of the requirements are met satisfactorily by ink made according to the formula for Government Standard Record Ink. Ink manufacturers as a rule do not even approximate the quality of the government ink, and the reasons for this are not far to seek. Since the user has no way of knowing, until many years have elapsed, that his ink, used on the prior date, was of a type that did not retain its color and intensity well, and normally has no occasion to learn of the ease with which the ink may be erased or altered chemically, the ink manufacturer has little need to do his best in making an ink, and his advertising and sales emphasis are upon factors which are, as a rule, of only trifling importance.

The best inks known at the present time are based on salts of iron, which are rarely found in the clear-tint or dye inks (brown, green, or bright blue in color). It is rarely justified, therefore, to buy the clear-colored inks, for they seldom exhibit a desirable degree of permanence when exposed to ultraviolet or sunlight for short periods, and they are often highly susceptible to chemical erasure. (Where fading is referred to in the listings, the reference is to fading by ultraviolet light, equivalent to exposure to sunlight or daylight.)

Most of the tests in the present series were conducted according to the requirements of the government's Specifications for Copying and Record Inks. There were, however, some variations in procedure and application. It was found, for instance, that pH measurements were a satisfactory means of judging the corrosive qualities of ink, and, of course, much more convenient than the recommended method of measuring the weight loss of a steel pen point immersed in the ink for 48 hours. In the tests conducted for CR, a method was developed for determining the resistance to mechanical erasure by utilizing a revolving table and standard abrasive wheels. The ability of an ink to resist mechanical erasure depends almost wholly upon its degree of penetration into the paper; for this reason, inks, such as *Parker "51" Tunis Blue* or *India Black*, which exhibit some "strike" into the paper probably because of a small content of "surface-active" agent, showed up best in this test. In order that there may be the largest practicable degree of penetration into the paper and the best possible resistance to intentional mechanical erasure and to chemical alteration, as well as the alteration which comes from light and impurities in the air, it is desirable to use a pen with a rather heavy feed when writing important documents. A rather sharp or somewhat scratchy point also favors maximum lasting qualities in the writing.

Of the new and highly advertised *Parker "51" Superchrome Inks*, the *Superchrome Blue* was the only color of the five tested whose permanence was in any way comparable to that of the Government Record Ink, and that was only in its resistance to ultraviolet. Feathering of these new *Parker Superchrome* and the older *Parker "51"* inks is not very serious on most good writing papers when used in the *Parker "51"* pen, but they do "feather" to some extent on most other types of paper and to a considerable extent on some.

A simple test is available which can be used by anyone who wishes to ascertain whether a particular ink uses iron or a dye as a basis for its permanence of color. Add 5 volumes of a bleach (such as *Clorox*) containing sodium hypochlorite to 1 volume of ink in a test tube, and then gently heat to boiling. The color of this solution will turn to a pale straw yellow if the ink used does not contain iron. If blue inks which contain iron are tested, the color will change from blue to brown, followed by the deposition of a red-brown flocculent precipitate. This test gives some information of a quantitative nature, since the volume of precipitate formed is an indication of the amount of iron present. When the test tube is allowed to stand until the precipitate settles, a precipitate which occupies about one-third of the total volume of liquid will indicate an ink of high iron content; an ink of undesirable composition (having a low iron content) will show only a slight red-brown sediment at the bottom of the test tube. (It is important to use the 1 to 5 ratio of ink to bleach, since no precipitate is formed with inks of high iron content at lower concentrations.)

In the ratings which follow, it should be especially noted that *Parker "51"* inks are for use in the *Parker "51"* pen only and will usually not work satisfactorily in any other type of pen.

Resistance to mechanical erasure was fair, unless otherwise noted.

Brand of Ink	Quality with respect to: Sediment	Fading	Water	Alcohol	Bleach Solution	Abrasion	pH	Iron Content
Government Record Ink	p	g	g	g	g	f	1.5	g
Waterman's Permanent Black	f	g	g	g	g	f	1.9	f
Waterman's Blue-Black No. 132	p	f	g	g	p	f	1.9	f
Carter's Midnight Black Permanent	p	g	f	p	p	f	5.8	u
Parker Quink Permanent Blue-Black	g	f	f	f	p	f	—	p
Parker Superchrome "51" Black	—	f	f	p	f	—	—	—
Sanfords Permanent and Photographic Blue Black	p	g	f	p	p	f	1.6	f
Sheaffer's Skrip Permanent Jet Black	g	g	p	p	p	f	2.4	u
Sheaffer's Skrip Permanent Royal Blue	g	f	f	f	p	f	2.9	u
Stafford's Permanent Blue-Black	p	g	f	f	p	f	1.8	p
Carter's Permanent Red	g	f	f	u	p	f	2.1	u
Carter's Midnight Blue-Black Permanent	g	f	f	p	p	f	2.2	p
Davids Electro-Chemical Blue-Black	u	p	p	p	—	—	1.3	—
Davids Concentrated Blue-Black (Powder)	u	g	f	f	p	—	—	—
Parker "51" India Black	p	f	p	f	f	g	11.6	u
Parker "51" Tunis Blue	f	g	p	u	p	g	11.7	u
Parker Quink Permanent Red	f	f	u	u	p	f	8.1	u
Parker Superchrome "51" Blue	—	g	u	u	p	—	—	—
Parker Superchrome "51" Blue-Black	—	p	p	p	p	—	—	—
Parker Superchrome "51" Green	—	f	p	u	f	—	—	—
Parker Superchrome "51" Red	—	p	u	u	u	—	—	—
Sheaffer's Skrip Permanent Blue-Black	g	p	p	p	p	f	3.7	u
Sheaffer's Skrip Permanent Red	p	p	g	u	p	f	—	u
Signet Permanent Blue-Black	u	p	p	u	—	—	—	—
Waterman's Red No. 516	g	g	u	u	p	f	7.8	u

In the above chart, *g* means that the particular characteristic was good, *f*—fair, *p*—poor, and *u*—unsatisfactory, according to context. Thus *f* under sediment means that there was a slight amount noticed, *g* that none was noticed. *f* under resistance to water would mean that the ink's resistance to loss from the paper in water was fair.

A pH of 7.0 is considered neutral (non-alkaline, non-acid). A pH less than 7.0 corresponds to acidity, a pH greater than 7.0 corresponds to alkalinity. From 1.5 to 2.0 is considered the optimum pH range for acid base gallo-tannate inks.

A. Recommended

Government Copying and Record Ink, prepared according to Federal Specification TT-I-521.[1] Excellent resistance to chemical erasure. Lines drawn with the ink showed practically no fading due to light. Highest iron content of all inks tested.

Waterman's Permanent Black (L. E. Waterman Co., 544 Hudson St., New York 14) 15c for 2-oz. bottle. Very slight fading. Resistance to chemical erasure, good. Satisfactory iron content.

[1] Bu. Standards Circular C426—INKS, by C. E. Waters, supplies directions for preparing this ink and also contains much additional valuable information concerning inks in general. Available from the Superintendent of Documents, Washington, D.C., at 15 cents. (77 page with biblio.)

B. Intermediate

Waterman's Blue-Black No. 132. 10c for 2-oz. bottle. Slight fading. Resistance to chemical erasure, poor to good. Satisfactory iron content.

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The following inks, though also rated *B. Intermediate*, are not considered equal to *Waterman's 132.* It is considered that they would, however, serve for most persons' writing requirements.

Carter's Midnight Black Permanent (Carter's Ink Co., Kendall Square, Boston) 10c for 2-oz. bottle. Fading, very slight. Poor to fair resistance to chemical erasure. Not an iron ink.

Parker Quink Permanent Blue-Black (The Parker Pen Co., Janesville, Wis.) 25c for 4-oz. bottle. Fading, slight. Fair to poor resistance to chemical erasure. Low iron content.

Parker Superchrome Black. 50c for 4-oz. bottle. Fading, slight. Poor to fair resistance to chemical erasure.

Sanfords Permanent and Photographic Blue Black (Sanford Ink Co., W. Congress & Peoria Sts., Chicago) 10c for 2-oz. bottle. Fair to poor resistance to chemical erasure. Very slight fading. Satisfactory iron content.

Skrip, Sheaffer's Permanent Jet Black (W. A. Sheaffer Pen Co., Fort Madison, Iowa) 13c for 2-oz. bottle. Fading, very slight. Poor resistance to chemical erasure. Low iron content.

* * *

Both rather weak in color:

Skrip, Sheaffer's Permanent Royal Blue 25c for 4-oz. bottle. Fading, slight. Fair resistance to chemical erasure. Low iron content.

Stafford's Permanent Blue-Black (S. S. Stafford, Inc., 609 Washington St., New York 14) 15c for 2½-oz. bottle. Fading, very slight. Fair resistance to chemical erasure. Iron content somewhat low.

C. Not Recommended

Carter's Midnight Blue-Black Permanent. 10c for 2-oz. bottle. Fading, slight. Fair to poor resistance to chemical erasure. Iron content somewhat low.

Davids Electro-Chemical Blue-Black (C. I. Davids & Son) 33c for 8-oz. bottle. Considerable sediment. Writing was so pale that ink was practically unusable.

Davids Concentrated Blue-Black (Powder). 35c for sufficient amount to make one quart of ink.

Parker "51" India Black. 25c for 3-oz. bottle. Fading, slight. Fair resistance to chemical erasure; good resistance to mechanical erasure. Not an iron ink. (Colorimetric analysis indicated the presence of chromium.)

Parker "51" Tunis Blue. 25c for 3-oz. bottle. Fading, very slight. Poor resistance to chemical erasure. Good resistance to mechanical erasure. Not an iron ink. (Colorimetric analysis indicated presence of vanadium.)

Parker Superchrome Blue. 50c for 4-oz. bottle. Showed only very slight fading (comparable to Government Ink in this respect). Resistance to chemical erasure was poor to very poor.

Parker Superchrome Blue-Black. 50c for 4-oz. bottle. Fading, considerable. Resistance to chemical erasure, poor to fair.

Parker Superchrome Green. 50c for 4-oz. bottle. Fading, very slight. Resistance to chemical erasure, fair to unsatisfactory.

Skrip, Sheaffer's Permanent Blue Black. 25c for 4-oz. bottle. Fading, excessive. Poor resistance to chemical erasure. Very low iron content.

Signet Permanent Blue-Black (Russia Cement Co., Gloucester, Mass.) 50c for 16-oz. bottle. Considerable sediment. Writing very pale.

* * *

Because red inks cannot be compared in resistance to chemical erasure to other inks which are used for general writing purposes, they are listed and rated separately below. It should be noted that a red ink rated *B. Intermediate* cannot be considered comparable to an ink of the same rating in the general listing, though some red inks were better in all respects than several of the general writing inks. Red inks, however, are not iron inks.

B. Intermediate

Carter's Permanent Red. 10c for 2-oz. bottle. Best of the red inks tested. Fading slight but considered not excessive for a red ink. Resistance to chemical erasure, unsatisfactory to fair.

C. Not Recommended

Parker Quink Permanent Red. 15c for 2-oz. bottle. Fading, slight. Completely removed by water and alcohol, hence not a permanent ink, as claimed by maker.

Parker Superchrome Red. 50c for 4-oz. bottle. Fading, considerable. Resistance to chemical erasure, very poor.

Skrip, Sheaffer's Permanent Red. 22c for 4-oz. bottle. Fading, excessive. Poor resistance to chemical erasure. Not "permanent."

Waterman's Red No. 516. 10c for 2-oz. bottle. Fading, very slight. Very poor resistance to chemical erasure.

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Abridged Cumulative Index of Previous 1948 Issues Consumers' Research Bulletin

†Indicates that listings of names or brands are included.

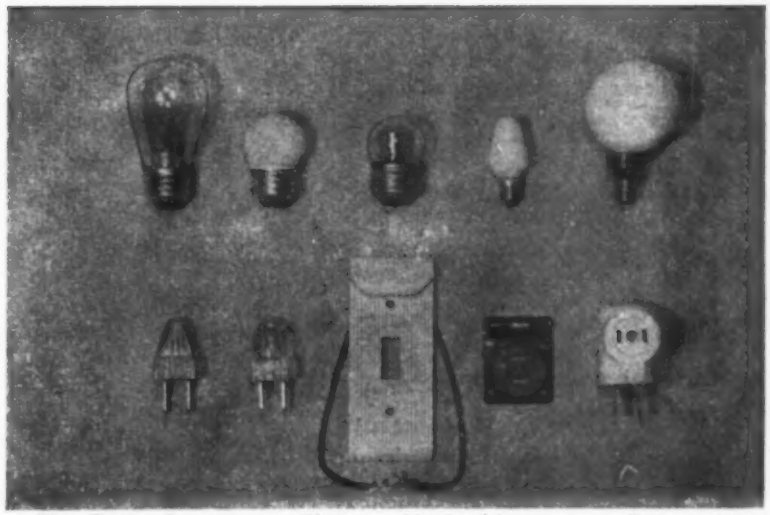
Night Lights

NIGHT LIGHTS fall into two general classifications: those which provide sufficient light to permit one to see and recognize objects in a room without other lighting, and those which serve only as markers to indicate the position of a door, a stairway, a switch plate, and the like.

In the first class are low-power incandescent, neon, and fluorescent lamps. Small incandescent lamps used as night lights have relatively limited lives. Small fluorescent lamps appear to have a much longer life on the average, and neon lamps, unless defective, may often be expected to burn for a year or two, with gradually diminishing output due to blackening of the glass, if burned only during night hours. The orange-red color of neon lamps has high visibility for most eyes, but some persons may find the color objectionable.

Most very small neon bulbs (about ¼ inch diameter by 1 inch long) of the kind known as marker lights, have a power input at 120 volts of 0.05 watt or less, but for some this may run as high as about 0.15 watt. Because of the small amount of light emitted, such a bulb serves only as a marker or as an indicator of a "live" circuit. The power drawn by a bulb of this variety is so small that continuous operation would scarcely show on the electric light bill (about 3c per year at average rates for power; the common 7½-watt [*Mazda*] lamp, which gives a good general night-lighting in a room, uses about $2.30 worth of electricity in a year, at average rates).

Listings which follow are in approximate order of desirability in each classification. In order to correlate lamp life, as stated, with actual life "in use," it should be noted that a lamp would burn 8760 hours in a year, burning 24 hours each day, or 2920 hours when burning only 8 hours per day.



Top Row: 2-watt neon, 7½-watt *Mazda*, ½-watt neon, 7-watt night light, *Sylvania* 5-watt fluorescent.

Bottom Row: *Nite-T-Lite, Robolite, Luminite Lighted Wall Switch Plate, Handi-Glow Pilot Test Light, Luminite Safety Plug.*

Night Lights for Lighting a Room or Limited Area

A. Recommended

2-watt Neon Lamp NE 34 (General Electric Co.) 59c at a retail radio store; also available from Lafayette Radio, 100 Sixth Ave., New York 13, 49c (tax included). 105-125 volts. A pear-shaped bulb, of approximately the same size as an ordinary 15-watt incandescent bulb; medium screw base (about 1 in. diameter—the same base as used on standard household incandescent lamp bulbs). Light was emitted at the surfaces of 2 metal half-disks, separated along their common diameter by about 1/16 in.; one side glows on direct current, and both glow on alternating current. Objects in a room could be recognized readily by the light of this bulb. No life tests were made, but the average lamp of this type will usually give good light up to about 5000 hours.

½-watt Neon Lamp NE 27 (General Electric Co.) 39c at a retail radio store. 105-125 volts. A spherical bulb about 1¼ in. in diameter; medium screw base. Light is emitted at the surfaces of 2 half-cylinders which rise vertically from the base. Objects in a small room can be recognized by the light of this bulb. Life about 3000 hours.

7½-watt Mazda Night Light with S11 Bulb (General Electric Co.) 11c (including tax) at a retail store. 120 volts. An outside-coated (frosted) incandescent lamp of about the same size and shape as the ½-watt neon bulb listed above; medium screw base. This small lamp is commonly used in electric refrigerators. Provided sufficient light to permit recognition of objects in a room of considerable size; for a bedroom it provided more light than is desirable, unless shielded. Average burning time of the 6 bulbs tested was 1628 hours (minimum 1132, maximum 2274 hours).

7-watt Night Light (Westinghouse Electric Co.) 12c at a retail store. 120 volts. A conical coated bulb about ⅞ in. in maximum diameter; candelabra base (about 7/16 in. diameter—smaller than the medium screw base). Like the 7½-watt bulb listed above, this bulb provided sufficient light to permit recognition of objects in a room of considerable size; for a bedroom it provided more light than is desirable, unless shielded. To use this lamp on ordinary household circuits, it must be screwed into an adapter. One type of adapter is fitted with medium screw base which screws into any regular lamp socket; another type is fitted with double

flat prongs and is plugged into a "convenience" outlet in the same way as is an appliance plug. Adapters of the second type mentioned are obtainable with various forms of shields, and some have switches also. Average burning time of the 6 lamps tested was 3673 hours.

Sylvania Fluorescent Christmas Tree Lights (Sylvania Electric Products, Inc.) 65c each at a retail store. Marked 120 volts, 5 watts, alternating current. A spherical fluorescent-coated bulb about 2 in. in diameter; candelabra skirted base. The ballast resistor for the glow discharge to energize the lamp was included in the base of the lamp. Two yellow, 2 green, and 2 blue lamps were tested. Objects in a room can be recognized readily by the light from any one of these lamps, although blue gives less visual light than either yellow or green. Six lamps tested, all operative after 5600 hours of continuous burning. Average measured input power at 120 volts was 4.4 watts. The lamp may be used in either type of adapter previously mentioned, but the shields used for the 7-watt pear-shaped incandescent lamp will not fit over a bulb of such large size.

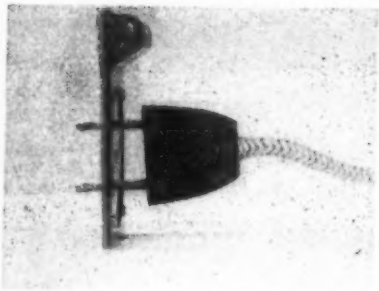
Marker Lights for Position-Indication Only

A. Recommended

The lights are listed alphabetically.

Luminite Lighted Wall Switch Plate (Associated Projects Co., Columbus 15, Ohio) $1 at a retail store. Light, only, replaceable by manufacturer for 35c. Consisted of a switch plate of a plastic material, with a small neon lamp at the top; terminals are provided for connection to the switch terminals. When the switch is in the "off" position, the lamp glows, because it is in series with the load (room lamps, for example) controlled by the switch; when the switch is in the "on" position, the lamp is extinguished because it is short-circuited by the switch. This device was a marker only, and does not light up objects in the room. Five units tested were still operative at the end of 5600 hours of continuous burning. Life estimated at something like 25,000 hours. Average measured input power at 120 volts was 0.036 watt.

Luminite Safety Pilot Plug (Associated Projects Co.) 50c at a retail store. This device looks like usual cube tap; in place of the usual receptacle at one face of the cube, there is a plastic cover with a small neon lamp behind it; the two side receptacles are available for plugging in appliance cords as in any other cube tap. It serves as a marker only. Six units tested, all operative after 5600 hours of continuous burning. Average measured input power at 120 volts was 0.085 watt.



Handi-Glow Pilot Test Light with plug partly inserted.

Robolite (Universal Microphone Co., Inglewood, Calif.) 29c at a retail store. Marked for use on direct or alternating current, but voltage not shown. The device was a small neon lamp in a clear plastic housing, with prongs which permitted it to be plugged into any convenience outlet. White objects were visible at a distance of 1 ft.; thus, as a practical matter, *Robolite* was a marker only. Six units tested, all operative after 5600 hours of continuous burning. Power, 0.035 watt.

B. Intermediate

Handi-Glow Pilot Test Light (Industrial Devices, Inc., Edgewater, N.J.) 48c at a retail store. In use this device is slipped over the prongs of the plug of an appliance cord and the plug inserted as usual in a convenience outlet. Metal contacts in the 2 slots of the device connect to a small neon lamp in one end of the plate, and the light indicates that the current is "on." White objects were visible at a distance of about 1 foot. Six units tested, all operative after 5600 hours of continuous burning. Power, 0.035 watt. Considered less convenient and desirable than *Luminite Safety Pilot Plug* used for the same general purpose.

C. Not Recommended

Nite-T-Lite (Littelfuse, Inc., Chicago 40) 29c at a retail store. A small plug-in type neon marker light, similar to *Robolite*. Marked for use at 110-120 volts, direct or alternating current. White objects were visible at a distance of about 1 foot. Four of the 6 units tested were still operative at the end of 5600 hours of continuous burning; 1 burned out after 100 hours, another after 236 hours. Average, 0.10 watt.

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Subscribers' attention is invited to the fact that when they write us on a question having to do with their subscription, it should be on a **separate** sheet of paper from any correspondence on any other subject. If you are writing us about several subjects, please use a separate sheet for each subject, putting your name and address on each sheet, so that they may be sent here to different departments for attention, with less delay than would otherwise be necessary.

At the present time, the volume of incoming subscriptions is so large that it is not possible to give subscription orders or letters prompt handling, and if any other topics are raised or discussed on the subscription order, letter, or form, acknowledgement on those points will necessarily be delayed until the subscription matters have been taken care of.

Please note also that when writing on topics other than subscription details, your inquiry should be accompanied by a ready-addressed, stamped envelope, preferably one of the No. 10 or No. 11 size, which are about 10 and 10½ inches in length, respectively, to facilitate our reply. Inquiries accompanied by a stamped addressed envelope will naturally be given preference over other communications.

Ratings of Motion Pictures

THIS section aims to give critical consumers a digest of opinion from a wide range of motion picture reviews, including the motion picture trade press, leading newspapers and magazines—some 19 different periodicals in all. The motion picture ratings which follow thus do not represent the judgment of a single person, but are based on an analysis of crictics' reviews.

The sources of the reviews are:

Box Office, Charm, Chicago Daily Tribune, The Christian Century, Cue, Daily News (N.Y.), *The Exhibitor, Harrison's Reports, Motion Picture Herald, National Legion of Decency List, Newsweek, New York Herald Tribune, New York Times, Parents' Magazine, Release of the D.A.R. Preview Committee, Successful Farming, Time, Variety* (weekly), and *Unbiased Opinions of Current Motion Pictures* which includes reviews by the General Federation of Women's Clubs, the American Legion Auxiliary, National Film Music Council, and others.

The figures preceding the title of the picture indicate the number of critics who have been judged to rate the film A (recommended), B (intermediate), and C (not recommended) on its entertainment values.

Audience suitability is indicated by "A" for adults, "Y" for young people (14-18), and "C" for children, at the end of each line.

Descriptive abbreviations are as follows:

adv—adventure
biog—biography
c—in color (Technicolor, Cinecolor, Trucolor, Magnacolor, or Vitacolor)
car—cartoon
com—comedy
cri—crime and capture of criminals
doc—documentary
dr—drama
fan—fantasy
hist—founded on historical incident
mel—melodrama
mus—musical
mys—mystery
nov—dramatization of a novel
rom—romance
soc—social-problem drama
trav—travelogue
war—dealing with the lives of people in wartime
wes—western

A	B	C		
—	3	9	**Adventure Island**	*adv-c A*
—	2	1	**Albuquerque**	*wes-c AYC*
—	3	2	**Along the Oregon Trail**	*mus-wes-c AYC*
—	3	7	**Always Together**	*com A*
1	1	5	**An Ideal Husband**	*dr A*
—	3	1	**Angels of the Streets**	*soc-dr AY*
—	2	4	**Anything for a Song**	*mus-dr A*
—	—	3	**Arnelo Affair, The**	*cri-mel A*
—	3	1	**Bandits of Dark Canyon**	*wes AYC*
—	7	—	**Beauty and the Beast**	*fan A*
—	3	6	**Beware of Pity**	*dr A*
—	4	4	**Big Town After Dark**	*cri-mel A*
—	6	—	**Bill and Coo**	*com-c YC*
1	11	3	**Bishop's Wife, The**	*fan A*
3	7	4	**Black Gold**	*dr-c AYC*
1	6	9	**Black Narcissus**	*dr-c A*
—	1	8	**Blackmail**	*mys-mel A*
—	1	4	**Blonde Savage**	*adv AY*
—	5	3	**Blondie in the Dough**	*com AYC*
—	1	2	**Blondie's Anniversary**	*com AYC*
—	—	6	**Blue Veil, The**	*dr A*
1	13	3	**Body and Soul**	*dr A*
—	4	2	**Bowery Buckaroos**	*com AYC*
—	6	8	**Brute Force**	*cri-mel A*
—	—	5	**Buckaroo from Powder River**	*mus-wes AYC*
—	1	5	**Bulldog Drummond at Bay**	*mys-mel AYC*
—	3	2	**Bulldog Drummond Strikes Back**	*mys-mel AY*
—	4	6	**Burning Cross, The**	*dr A*
—	2	7	**Bury Me Dead**	*cri-mel A*
—	10	1	**Bush Christmas**	*mel YC*
1	1	1	**Call Northside 777**	*doc-mel A*
—	8	2	**Captain Boycott**	*hist-dr A*
1	8	4	**Captain from Castile**	*hist-dr-c A*
—	2	5	**Caravan**	*adv A*
—	3	4	**Carnival of Sinners**	*dr A*
—	—	—	**Cary and the Bishop's Wife** (See Bishop's Wife, The)	
—	—	4	**Case of the Baby Sitter**	*com A*
2	10	2	**Cass Timberlane**	*nov A*
—	2	1	**Cavalleria Rusticana**	*mus-dr A*
—	3	1	**Check Your Guns**	*mus-wes AYC*
—	3	1	**Cheyenne Takes Over**	*wes AYC*
—	1	2	**Children on Trial**	*doc-dr A*
—	3	2	**Chinese Ring, The**	*mys-mel AYC*
—	5	11	**Christmas Eve**	*dr A*
—	—	3	**Code of the Saddle**	*wes AYC*
—	2	3	**Comedy Carnival**	*com-c A*
—	3	9	**Corpse Came C.O.D., The**	*cri-com A*
—	3	5	**Crime Doctor's Gamble, The**	*cri-mel A*
—	4	3	**Crimson Key, The**	*mys-mel A*
2	13	4	**Crossfire**	*soc-mel A*
—	9	6	**Daisy Kenyon**	*dr A*
—	3	2	**Dangerous Years**	*mel AYC*
—	8	6	**Dark Passage**	*nov A*
—	8	8	**Deep Valley**	*mel A*
—	3	12	**Desert Fury**	*mel-c A*
—	2	10	**Desire Me**	*war-dr A*
—	—	5	**Devil Ship**	*mel A*
—	2	6	**Devil's Envoys, The**	*fan A*
—	4	5	**Dick Tracy Meets Gruesome**	*mel A*
1	6	—	**Double Life, A**	*dr A*
2	11	6	**Down to Earth**	*mus-fan A*
—	4	2	**Dragnet**	*cri-mel AY*
—	4	3	**Driftwood**	*dr AYC*
—	1	4	**Elixir of Love**	*mus-dr A*
1	3	8	**Escape Me Never**	*dr A*
1	4	2	**Eternal Return, The**	*dr A*
—	8	4	**Exile, The**	*hist-dr AY*
—	1	6	**Exposed**	*cri-mys AY*
—	6	3	**Fabulous Texan, The**	*mel A*
—	1	3	**Farewell, My Beautiful Naples**	*mus-dr A*
—	1	3	**Fighting Vigilantes**	*wes AYC*
—	2	4	**Flame, The**	*cri-mel A*
—	—	3	**Flashing Guns**	*wes AYC*
—	1	3	**For You I Die**	*mel A*
3	5	12	**Forever Amber**	*dr-c A*
—	8	7	**Foxes of Harrow, The**	*adv A*
1	10	3	**Frieda**	*war-dr A*
2	11	5	**Fugitive, The**	*dr A*
—	13	4	**Fun and Fancy Free**	*mus-car-c AYC*
—	5	2	**Furia**	*mel A*
—	4	8	**Gangster, The**	*mel A*
—	—	6	**Gas House Kids in Hollywood**	*mys-mel AYC*
—	3	1	**Gay Ranchero, The**	*mus-wes-c AYC*
4	11	2	**Gentleman's Agreement**	*dr A*
—	—	5	**Ghost Town Renegades**	*wes AYC*
—	4	1	**Girl of the Canal, The**	*dr AY*
—	1	5	**Glamour Girl**	*mus-com A*
—	9	8	**Golden Earrings**	*war-mel A*
—	10	3	**Good News**	*mus-com-c AYC*
—	1	3	**Great Betrayal, The**	*doc A*
—	4	1	**Great Dawn, The**	*mus-dr A*
—	2	3	**Great Glinka, The**	*mus-biog A*
1	4	9	**Green Dolphin Street**	*dr AY*
—	14	2	**Green for Danger**	*mys-mel A*
—	1	2	**Gun Talk**	*wes AYC*
—	—	—	**Hal Roach Comedy Carnival** (See Comedy Carnival)	
—	1	4	**Hat Box Mystery, The**	*mys-mel A*
—	3	2	**Heading for Heaven**	*com A*
—	6	9	**Heaven Only Knows**	*fan A*
—	11	6	**Her Husband's Affairs**	*com AY*
1	4	1	**High Tide**	*cri-mel A*
1	6	5	**High Wall**	*mel A*
—	4	2	**Homesteaders of Paradise Valley**	*wes AYC*
2	11	3	**Hucksters, The**	*nov A*
—	3	9	**Hungry Hill**	*dr A*

A	B	C		
—	5	3	**I Love Trouble**	*mys-mel A*
—	4	8	**I Walk Alone**	*cri-mel A*
—	5	5	**If Winter Comes**	*dr A*
—	3	1	**In Self Defense**	*mel A*
—	2	1	**In the Name of Life**	*dr A*
—	2	6	**Intrigue**	*mel A*
—	3	8	**Invisible Wall, The**	*cri-mel A*
1	6	10	**It Had to be You**	*com A*
—	4	—	**Joe Palooka in the Knockout**	*mys-mel AY*
—	2	8	**Key Witness**	*cri-mel A*
1	6	1	**Killer McCoy**	*mel A*
—	—	3	**King of the Bandits**	*wes AYC*
3	12	2	**Kiss of Death**	*mys-mel A*
—	3	1	**Last Days of Boot Hill**	*mus-wes AYC*
—	3	2	**Last Frontier Uprising**	*mus-wes-c AYC*
—	6	—	**Last Round-Up, The**	*mus-wes AYC*
—	—	5	**L'Atalante**	*dr A*
4	14	1	**Life With Father**	*com-c AYC*
—	1	4	**Linda Be Good**	*mus-com A*
—	5	11	**Living in a Big Way**	*mus-dr A*
—	5	4	**Lone Wolf in London, The**	*mys-mel A*
1	7	5	**Long Night, The**	*dr A*
—	5	8	**Lost Moment, The**	*dr A*
—	4	1	**Louisiana**	*mus-biog AY*
—	5	9	**Love from a Stranger**	*cri-mel A*
—	8	5	**Love Laughs at Andy Hardy**	*mus-com AY*
—	2	1	**Lover's Return, A**	*com A*
—	1	2	**Lucia di Lammermoor**	*mus-dr A*
2	10	5	**Lured**	*cri-mel A*
—	7	6	**Magic Town**	*dr A*
—	—	5	**Main Street Kid, The**	*com AY*
—	10	4	**Man About Town**	*com A*
—	2	5	**Marauders, The**	*wes AYC*
—	1	3	**Marco Visconti**	*adv A*
—	3	2	**Marshall of Cripple Creek**	*wes AYC*
—	1	2	**Mary Lou**	*mus-com AY*
—	8	6	**Merton of the Movies**	*com A*
—	—	4	**Midnight in Paris**	*cri-mys A*
—	1	5	**Millerson Case, The**	*cri-mel A*
—	10	4	**Mother Wore Tights**	*mus-com-c AY*
—	4	8	**Mourning Becomes Electra**	*dr A*
—	4	3	**Murderer Lives at Number 21, The**	*mys-mel A*
—	1	5	**My Father's House**	*doc-dr A*
1	2	—	**My Girl Tisa**	*dr AY*
—	9	1	**My Wild Irish Rose**	*mus-biog-c AY*
1	2	—	**Naked City, The**	*mel A*
—	7	6	**Nicholas Nickelby**	*nov AY*
—	5	4	**Night Song**	*mus-dr A*
—	6	13	**Nightmare Alley**	*mel A*
—	7	1	**On the Old Spanish Trail**	*mus-wes-c AYC*
—	2	1	**Open Secret**	*mel A*
—	6	5	**Out of the Blue**	*com A*
—	7	10	**Out of the Past**	*mys-mel A*
—	5	3	**Pacific Adventure**	*dr AYC*
2	5	—	**Panic**	*cri-mel A*
1	7	3	**Paradine Case, The**	*mys-mel A*
—	5	2	**Philo Vance's Secret Mission**	*cri-mel A*
—	1	5	**Pioneer Justice**	*wes AYC*
—	4	10	**Pirates of Monterey**	*mel-c A*
—	—	3	**Prairie Express**	*wes AYC*
—	1	2	**Prairie Raiders**	*mus-wes AYC*
—	1	7	**Pretender, The**	*cri-mel AY*
—	2	3	**Prince of Thieves, The**	*hist-dr-c AYC*
—	4	4	**Railroaded**	*cri-mel AY*
1	6	8	**Red Stallion, The**	*dr-c AYC*
—	5	—	**Relentless**	*wes-c AY*
—	3	3	**Return of Rin Tin Tin**	*dr-c YC*
—	1	4	**Return of the Lash**	*wes AYC*
—	4	1	**Revenge**	*war-dr A*
—	12	3	**Ride the Pink Horse!**	*cri-mel A*
1	11	—	**Road to Rio**	*mus-com AY*
—	—	4	**Road to the Big House**	*mel A*
—	1	2	**Robin Hood of Monterey**	*wes AYC*
—	3	2	**Robin Hood of Texas**	*mus-wes AYC*
—	14	3	**Romance of Rosy Ridge**	*mus-dr AY*
—	10	2	**Roosevelt Story, The**	*doc AY*
—	3	5	**Roses Are Red**	*cri-mel A*
—	3	2	**Russian Ballerina**	*mus-com A*
—	4	2	**Rustlers of Devil's Canyon**	*wes AYC*
—	5	9	**San Quentin**	*mel A*
—	—	4	**Scared to Death**	*mys-c A*
—	4	—	**Schoolgirl Diary**	*dr AYC*
—	3	6	**Second Chance**	*mys-mel AY*
—	3	5	**Secret Beyond the Door**	*mel A*
2	12	2	**Secret Life of Walter Mitty, The**	*mus-com-c AY*
—	15	2	**Senator Was Indiscreet, The**	*com A*
—	3	2	**Sepia Cinderella**	*mus-com A*
—	1	3	**Shadow Valley**	*mus-wes AYC*
—	3	3	**Shakuntala**	*dr A*
—	1	2	**She Returned at Dawn**	*dr A*
2	6	4	**Shoe Shine**	*dr A*
—	5	—	**Shop Girls of Paris**	*dr A*
—	5	11	**Singapore**	*mel A*
—	4	9	**Slave Girl**	*com-c A*
—	6	—	**Sleep, My Love**	*cri-mel A*
—	2	1	**Smoky River Serenade**	*mus-wes AYC*
1	9	6	**So Well Remembered**	*war-dr A*
—	7	5	**Something in the Wind**	*mus-com A*
—	3	4	**Son of Rusty, The**	*dr AYC*
3	7	7	**Song of Love**	*mus-dr AY*
2	4	—	**Song of My Heart**	*mus-dr AYC*
—	6	6	**Song of the Thin Man**	*mys-mel A*
—	1	3	**Song of the Wasteland**	*mus-wes AYC*
—	7	4	**Spirit of West Point, The**	*dr AYC*
—	4	3	**Sport of Kings**	*dr AYC*
—	3	1	**Springtime in the Sierras**	*mus-wes-c AY*
—	—	7	**Stepchild**	*soc-dr A*
—	1	7	**Stork Bites Man**	*com AY*
—	5	—	**Story of Tosca, The**	*mus-dr A*
—	2	3	**Sweet Genevieve**	*mus-com A*
—	—	3	**Swing the Western Way**	*mus-wes AYC*
—	10	4	**Swordsman, The**	*dr-c AYC*
—	—	5	**Symphonie Fantastique, La**	*mus-biog A*
1	9	2	**T-Men**	*doc-dr AYC*
1	6	3	**Tawny Pipit, The**	*com AYC*
1	5	1	**Tender Years, The**	*dr AYC*
—	1	4	**Tenth Avenue Angel**	*dr AY*
—	3	11	**That Hagen Girl**	*dr A*
1	10	4	**This Time for Keeps**	*mus-com-c A*
—	3	2	**Thunder in the Valley**	*dr-c AYC*
2	8	—	**To Live in Peace**	*war-mel AY*
—	4	—	**To the Ends of the Earth**	*doc-mel AY*
3	4	3	**Treasure of the Sierre Madre, The**	*dr A*
—	6	3	**Trespasser, The**	*mys-mel A*
—	—	4	**Twins**	*com A*
—	1	5	**Two Blondes and a Redhead**	*mus-com A*
—	8	7	**Tycoon**	*mel-c AY*
—	7	7	**Unconquered**	*hist-c A*
—	2	1	**Under Colorado Skies**	*wes-c AYC*
2	9	5	**Unfinished Dance, The**	*mus-dr-c AY*
—	7	5	**Unsuspected, The**	*mys-mel A*
—	3	5	**Untamed Fury**	*mel A*
—	2	10	**Upturned Glass, The**	*cri-dr A*
—	—	5	**Vacation Days**	*mus-wes AYC*
1	11	3	**Variety Girl**	*mus-com-c AY*
—	5	5	**Vigilantes Return, The**	*wes-c AYC*
1	11	2	**Voice of the Turtle, The**	*com A*
—	7	2	**Volpone**	*com A*
—	3	4	**Vow, The**	*dr A*
—	—	3	**We Lived Through Buchenwald**	*war-doc A*
—	—	6	**When a Girl's Beautiful**	*mus-com A*
—	11	4	**Where There's Life**	*com A*
—	1	3	**Whispering City**	*cri-mel A*
—	—	3	**White Stallion**	*wes AYC*
—	2	3	**Wild Frontier, The**	*wes AYC*
—	7	13	**Wild Harvest**	*mel A*
—	3	2	**Wild Horse Mesa**	*mus-wes AYC*
—	2	3	**Winner, The**	*mus-dr A*
—	9	3	**Wistful Widow of Wagon Gap, The**	*com A*
—	4	4	**Woman's Vengence, A**	*mel A*
—	1	6	**Women in the Night**	*war-mel A*
—	6	4	**Wyoming**	*wes AYC*
—	3	—	**You Were Meant for Me**	*mus-com AY*
—	—	5	**Zero de Conduite**	*dr A*
—	1	3	**Zygmunt Kolosowski**	*war-dr A*

The Consumers' Observation Post

(Coutinued from page 4)

WHAT IT COSTS to keep the family in clean clothes and linen for a year has just been computed by home economists at Cornell University. Using a non-automatic washing machine, the housewife will spend approximately $30 a year for soap, water, and repairs and current in the Ithaca area. The new automatic washers will run the bill considerably higher. If clothes are sent to a big city laundry, the family bill will run between $80 and $100 a year. The difference between the two figures is what the housewife earns per year by her work in doing the family laundry.

* * *

SUGAR should be plentiful this year, but whether it will be cheap depends entirely on the U. S. Department of Agriculture. The Cuban sugar crop will be large, probably the equal of that for last year, which was twice Cuba's pre-war output, according to The Wall Street Journal. Since many nations are cutting down on their purchases of sugar for lack of funds, there is plenty available for those who can afford to pay. What the price will be, however, is largely determined by the authority, not of an impersonal market place but that of a single government official, the Secretary of Agriculture who is empowered each year to decide on the amount of sugar that will be wanted by the United States next year. If the quota set for next year is large, the price of sugar will be kept down. On the other hand, if the quota is small, prices will tend to go up around the world no matter how large this year's supply.

* * *

THE PRESENT FEDERAL STANDARD OF IDENTITY for mayonnaise requires that the finished product contain not less than 50 percent of edible vegetable oil. The other ingredients that may be used are also specified. Where a product conforms to the Federal standard, it is not required to list its ingredients on the label; hence you will find in making your purchase of some particular brand of manyonnaise that there is no information given as to the character of its edible-oil content. Recently there has been a move by the federal govern-

ment to reopen the mayonnaise standard to require manufacturers to indicate on the label just what particular vegetable oil has been used in their product. The object is to provide information that would be exceedingly helpful to people with allergies. It is estimated that one-fifth to three-fifths of one percent of the population are allergic to cottonseed oil, the principal ingredient of many brands of mayonnaise and salad dressing. Manufacturers contend that it just isn't possible for them to be certain in their labeling because the tank cars in which the vegetable oils are shipped may be used one time for cottonseed oil and on the next trip for peanut oil. It appears that the subsequent shipment of peanut oil will be contaminated to some extent with cottonseed oil, and this is held to be enough to make labeling of peanut oil content alone inaccurate. The fastidious consumer will probably view with disfavor the whole idea of shipping a food ingredient in this manner, without taking the trouble to remove residues of previous shipments.

* * *

NEW OR NEWLY AVAILABLE:

10-power "Officer-of-the-Deck" telescope has been featured at a "bargain price" of $29.95. The item is one which was sold at a fixed price of $10 to dealers by the War Assets Administration, and while it is a well-made instrument, it appears to be no bargain at $29.95. Brownscope Mfg. Co., 24 W. 45th St., New York City, offer a 22X telescope at $22.50, with a leather carrying case. This glass would not serve for many uses as it was primarily intended as a spotting glass for the shooter. It looks like a better buy, but has a narrow field (about 80 feet at a thousand yards--suitable for spotting or keeping watch over a single object such as a distant boat or vehicle). It must be remembered, however, that any glass of high power, either 10X or 22X, will not give satisfactory vision without being rested on some solid object so that it can be held reasonably steady.

Leisure Soap (Leisure Soap Co., 4655 Kingswell Ave., Los Angeles 27) is a soap substitute which sells at 29 cents per package. Chemical analysis shows the composition to be approximately as follows: sulfonated synthetic detergent, 5%; sodium sulfate, 86%; water, 4%; and trisodium phosphate (anhydrous), 5%. The sodium sulfate present has some value as a builder, but its amount should not be too great, and since in this case the amount of sodium sulfate is far more than twice the amount of synthetic detergent, the product is greatly "overbuilt." This product is perhaps somewhat unusual among powdered detergents in this manner that approximately three-quarters of it is in the nature of a diluent.

PHONOGRAPH RECORDS

By Walter F. Grueninger

Please Note: Prices quoted do not include taxes. In the ratings AA indicates highly recommended; A, recommended; B, intermediate; C, not recommended.

ORCHESTRA

Khachaturian: *Masquerade.* Boston Pops Orchestra under Fiedler (6 sides). RCA Victor Set 1166. $4. Melodious, strongly rhythmic, nostalgic symphonic suite superbly performed. Recorded with over-all mike technique, all details not clear, lengthy reverberation period. Good bass for this orchestra. Superior to dry, hard recording of Asch Set 800 ($5.35).
Interpretation AA
Fidelity of Recording A

Mozart: *Symphony No. 35* ("Haffner") (5 sides) & **Gluck:** *Dance of the Spirits* (1 side). NBC Symphony Orchestra under Toscanini. RCA Victor Set 1172. An excellent work. The usual fierce, taut Toscanini interpretation with an awkward Minuetto Trio. Harshly recorded in an acoustically dead studio. The slow filler wobbles in my set because the hole is slightly off center. Overall, I prefer the relaxed performance and narrow ranged, heavily bassed, resonant chamber, Beecham recording in Columbia Set 399.
Interpretation B
Fidelity of Recording B

Offenbach: *Gaité Parisienne*—Ballet. Boston Pops Orchestra under Fiedler. 8 sides, RCA Victor Set 1147. $5. The complete score as performed by the Ballet Russe de Monte Carlo. Delightful, saucy dance music from various stage works of Offenbach. Heavy performance and loud recording. A highly recommended set, offering four sides of the best of this music, is Columbia Set X 115, $3.21.
Interpretation B
Fidelity of Recording A

Rimsky-Korsakoff: *Russian Easter Festival.* National Symphony Orchestra (Great Britain) under Enrique Jorda. 4 sides, Decca Set EDA 28. $5. A colorful work. Collectors familiar with the drama and speed of Stokowski's performances are likely to find this young Spaniard's interpretation unexciting though musicianly. He is even better recorded than Stokowski, however, who is well recorded on the 1929 Victor disks 7018/9 and in the 1943 RCA Victor Set 937. Imported
Interpretation A
Fidelity of Recording AA

CHAMBER AND INSTRUMENTAL

Bach: *Six Sonatas for Harpsichord and Violin.* Ralph Kirkpatrick and Alexander Schneider. 28 sides, Columbia Set 719 (two albums). $19.20. Uneven works for connoisseurs, adding up to good, but not best, Bach. Performed by two excellent chamber music players. Realistic balance, bland recording in a resonant room. Compared with the fine competitive Schwarz-Ehlers Gamut Sets 7 and 8, Columbia's performances are in no way inferior, the recording is less shrill, and surfaces are a little more quiet. **Interpretation AA**
Fidelity of Recording AA

Chopin: *Etudes* (Complete Op. 10 and Op. 25) (15 sides) and *Three Etudes Nouvelles* (1 side). Brailowsky (piano). RCA Victor Set 1171. $9. Among the masterpieces of short compositions for piano. Brailowsky, famous for Chopin cycles, fails to bring out all the poetry but he plays the *bravura* works marvelously. Recording lacks the full brilliance and wide dynamic contrast of best contemporary sets. Overall, superior to competitive separate sets of Opus 10 and Opus 25 and worth while, though imperfect. Good surfaces.
Interpretation A
Fidelity of Recording A

A Memorial to Bela Bartok. Bela Bartok at the Piano. 4 sides, Vox Set 625. $5. Bartok's "Bear Dance," "Evening in Transylvania," and 15 pieces from the collection, "For Children." The masters were cut, originally, for broadcast. Bartok, who died in 1945, announces each selection in Hungarian. Plastic pressings. Principally for collectors.
Interpretation AA
Fidelity of Recording B

VOCAL

Bach: *Cantata No. 140* ("Wachet Auf"). RCA Victor Chorale and Orchestra under Shaw. 8 sides, RCA Victor Set 1162. $4. Lovely, joyous work. Splendid direction, orchestra and chorus. Soloists lack distinction. Recording needs more bass and better balance in the first duet which favors the baritone.
Interpretation A
Fidelity of Recording A

A Choral Concert. De Paur's Infantry Chorus. 6 sides, Columbia Set 709. $4.60. Songs of faith sung in English, including "Eili Eili," "Deep River," "Hospodi Polmilui," "Lord's Prayer," etc. Weak soloists and rough choral texture. Recording sounds best with highs attenuated.
Interpretation B
Fidelity of Recording AA

Gregorian Chant. *Cantus Mariales,* Set 1. *Missa Gaudens Gaudebo,* Set 2. Sung by the Monks of St. Benoit-du-Lac. Each set 8 sides, $7. Recorded at the Monastery and issued by the Benedictine Monks, Saint Benoit-du-Lac, Quebec, Canada. (Available direct. Railway Express Agency, on delivery, collects Customs Fee of $1.65 additional on an order for both sets.) Music of the 10th to 15th centuries. A superb example of Plainsong made in the authentic atmosphere with unobtrusive organ accompaniment. The group is world famous. Excellent recording and surfaces. Unique sets, highly recommended to schools, religious groups, connoisseurs. Let the cautious try Set 1 first.
Interpretation AA
Fidelity of Recording AA

The Minstrel Boy. Christopher Lynch (tenor). 8 sides, Columbia Set 722. $4.75. Passable singing of nine songs associated with Ireland: "Rose of Tralee," "A Ballynure Ballad," "Young May Moon," etc. Successful recording.
Interpretation A
Fidelity of Recording AA

Sacred Arias of Johann Sebastian Bach. Carol Brice (contralto). 4 sides, Columbia Set X 283. $3.35. Arias from the "Mass in B Minor" and the "Magnificat." A voice of beauty still lacks depth of feeling.
Interpretation A
Fidelity of Recording AA

Wagner: *Tristan und Isolde*—Love Duet. Traubel, Ralf, Glaz (singers). 4 sides, Columbia Set MX 286. $3.35. The famous love scene. Fritz Busch, orchestra conductor, is the hero. None of the singers scales the heights, though Traubel is best. Monitoring robs the climax of strength. With the exception of the orchestra, inferior to Flagstad-Melchior RCA Victor Set 671.
Interpretation B
Fidelity of Recording A

LIGHT, POPULAR, and MISCELLANEOUS

Carle Comes Calling. Frankie Carle (piano) with rhythm section. 8 sides, Columbia Set C 129. $3.75. Pleasant playing of "Star Dust," "Canadian Capers," "I'll Get By." etc.
Interpretation AA
Fidelity of Recording B

Dorothy Shay Goes to Town (vocalist). 8 sides, Columbia Set C 155. $3.75. Prosaic songs delivered with a dash of Hildegarde and Beatrice Kay, though not as cleverly. Less intriguing than her naughty Columbia Set C 119.
Interpretation B
Fidelity of Recording A